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EDITORIAL

THE XIVth INTERNATIONAL VETERINARY CONGRESS

Soon after the issue of this number of the *British Veterinary Journal,* the XIVth International Veterinary Congress will have opened. We extend a hearty welcome to London to all delegates attending the Congress and especially to those from overseas; and we wish the Congress every success. Elsewhere in this number will be found the programme which is to be presented. It covers many subjects of topical interest with emphasis on food production, a worthy consideration at the present time. We have written on several occasions on the benefits to be derived from exchanges of views and information and we reiterate our belief that the most satisfactory method of getting to know what is going on in different parts of the world is the holding of conferences or congresses such as this, where veterinarians from the different countries can get to know one another and can discuss subjects of common interest.

This is the fourteenth international veterinary congress to be held. Our predecessors showed much wisdom and breadth of vision when they inaugurated such congresses; as the years have passed these congresses have become more and more important and have attracted greater numbers of scientific workers to them. Nothing but good can accrue from these meetings, for the newest discoveries in the scientific world are freely debated and the experiences of workers from many countries are related. It is often so very easy to accept the results of research without due attention being given to the varying conditions through the world which may modify their practical application. The more one travels throughout the world, the more does one realise the difficulties of application of some of the apparently simple methods of disease control: the more also does one appreciate the conditions under which our veterinary colleagues may have to work. It is not possible for many of us to travel abroad, much as we might like to do so. Congresses, therefore, with representatives from the many

countries, is the next best thing and it behoves all of us, in the country in which the congress is being held, to make a special effort to attend. All the subjects to be discussed may not appeal to, or be of interest to, all veterinarians, but there is sure to be some item or group of items in which we are specially interested, and concerning which we want up-to-date information or to relate our experiences. Quite apart, therefore, from the social contacts with our veterinary colleagues from different parts of the world, the Congress should be of value to us from the purely scientific point of view.

There is another important part which these congresses play: the policy of a country in the control of a disease or group of diseases may be altered by the information supplied by the actual workers and by the discussions which follow. Too much stress cannot be laid on experience: an exchange of experiences on any subject by observers throughout the world is invaluable to those who have to advise upon control measures, especially concerning some of the major diseases of livestock and the maintenance of their health.

Immediately following the International Veterinary Congress is the Annual Congress of the National Veterinary Medical Association where subjects of a somewhat different type will be discussed and demonstrations will be staged. In this country we all look forward to, and appreciate, this annual congress. On this occasion we hope that many veterinarians from other countries will be able to spare a few extra days and grace the N.V.M.A. Congress with their presence. There is no need to point out the benefits we all gain from the N.V.M.A. Congress every year; on this occasion our friends from abroad will see how these annual meetings are conducted and the standard of scientific work discussed.

We look forward, then, with much pleasure, to seeing friends of former years and to making new friends at both meetings; men and women, whose names in their own spheres of work, are known to all of us, will, we hope, be more than names in the future; we should be able to look back in the years to come to these meetings, recalling the presence of, and the discussions we have had with, many veterinarians from many different countries. When their names appear as authors of articles in the various veterinary periodicals we will remember their contributions at the meetings this year and will appreciate their points of view—our interest in them will be more intimate. There is no doubt whatever that the two meetings will be highly successful and will go far to cement the friendship and relationship between veterinarians throughout the world, whose object is essentially to suppress disease and to improve upon the health and productivity of livestock throughout the world and so ensure better nutrition for the people. We warmly welcome all who are attending the meetings and we hope that many will be able to remain in the country for a further period and visit our institutions, schools, etc.

XIVth INTERNATIONAL VETERINARY CONGRESS

London, August 8th to 13th, 1949

TIME-TABLE OF MEETINGS

A.—CENTRAL HALL. *B.*—HOARE MEMORIAL HALL.
C.—WESTMINSTER SCHOOL. *D.*—BISHOP PARTRIDGE HALL. *E.*—CONVOCATION HALL.
HALLS B, D, & E ARE SITUATED IN CHURCH HOUSE.

SUNDAY, AUGUST 7.

2 p.m. to 2.30 p.m.—*A.* Registration.
2.30 p.m.—Permanent Commission meets in the Council Chamber in Church House.
4 p.m. to 6 p.m.—Tea and Conversazione at Ashburnham House.
6.30 p.m.—Service, Westminster Abbey.

MONDAY, AUGUST 8.

10 a.m.—*A.* Official opening of the Congress.
11.15 a.m.—*A.* The World Food Situation, Lord Boyd Orr.
2.15 p.m.—*A.* 3 (*a*) Foot-and-Mouth Disease Vaccination. *B.* 3 (*e*) Swine Fever. *C.* 6 (*a*) Surgery on the Farm. *D.* 4 (*a*) (i) Metabolism. *E.* 5 (*a*) Plants as Foodstuffs.
3.45 p.m.—*A.* 3 (*f*) Rinderpest. *B.* 3 (i) Swine Influenza. *C.* 1 (*b*) Helminth Diseases. *D.* 4 (*a*) (ii) Copper Deficiencies. *E.* 5 (*b*) Husbandry Problems.
Reception given by the President and Council of the Royal College of Veterinary Surgeons. (Evening dress optional.)

TUESDAY, AUGUST 9.

10 a.m.—*A.* The Veterinary Profession's Contribution to the World's Milk Supply, Professor H. C. Bendixen.
11.15 a.m.—*A.* Films.
2.15 p.m.—*A.* 2 (*c*) Bovine Tuberculosis Control. *B.* 3 (*b*) Equine Infectious Anæmia. *C.* 1 (*a*) Protozoal Diseases. *D.* 4 (*a*) (iii) Vitamins.
3.45 p.m.—*A.* 2 (*d*) Tuberculosis. *B.* 3 (*j*) Other Virus Diseases of Cattle and Horses. *C.* 1 (*c*) Arthropod Diseases. *D.* 4 (*b*) Acetonæmia.
Banquet to Government Delegates given by His Majesty's Government. (Dress: Lounge suits.)

WEDNESDAY, AUGUST 10.

10 a.m.—*A.* The Veterinary Profession's Contribution to the World's Meat Supply, Dr. C. S. M. Hopkirk.
11.15 a.m.—*A.* Films.
2.15 p.m.—*A.* 2 (*a*) Bovine Mastitis. *B.* 3 (*d*) Newcastle Disease. *C.* 6 (*b*) Anæsthesia. *D.* 4 (*c*) Infertility.
3.45 p.m.—*A.* 2 (*b*) Brucellosis. *B.* 3 (*g*) Coryza. *C.* 6 (*c*) Electrocardiography. *D.* 4 (*e*) Endocrines.
7.30 p.m. for 8 p.m.—Congress Banquet, Savoy Hotel. (Dress optional.)

THURSDAY, AUGUST 11.

10 a.m.—*A.* The Veterinary Profession's Contribution to the World's Poultry and Egg Supplies, Dr. J. R. Beach.

11.15 a.m.—*A.* Films.

2.15 p.m.—*A.* 2 (*e*) Salmonella. *B.* 3 (*c*) Teschen Disease. *C.* 7 (*b*) Quarantine. *D.* 5 (*c*) Genetics.

3.45 p.m.—*A.* 7 (*a*) Animal Products. *B.* 3 (*h*) Rabies. *C.* 8 (*a*) Veterinary Education. *D.* 5 (*d*) Artificial Insemination.

6.00 p.m. to 7.30 p.m.—Reception to all Overseas Visitors from the British Commonwealth and their Ladies.*

FRIDAY, AUGUST 12.

9.45 a.m.—*A.* The Veterinarian and the Breeding and Rearing of Animals, Professor N. Lagerlof.

11 a.m.—*A.* Veterinary Education and its Application to World Problems, Dr. W. R. Wooldridge.

12.15 p.m.—*A.* National Veterinary Medical Association Opening Meeting.

2.15 p.m.—*B.* & *D.* National Veterinary Medical Association.

3 p.m.—Permanent Commission.

3.45 p.m.—*B.* & *D.* National Medical Association.

8.30 p.m.—Reception given by the President of the National Veterinary Medical Association.†

SATURDAY, AUGUST 13.

10 a.m.—*A.* Closing Meeting of International Congress.

10 a.m.—*A. B.* & *D.* National Veterinary Medical Association. Meetings continuing throughout the day.

* Given by the Overseas League at Overseas House, St. James's, S.W.1.

† By Invitation, Dorchester Hotel. (Evening dress optional.)

THE XIVth INTERNATIONAL VETERINARY CONGRESS

LONDON, AUGUST 8 TO 13, 1949

I. A GREETING

GATHERED together in London in this year 1949, within a few years after a second world convulsion—that is, in circumstances resembling, on the surface, at any rate, those of the preceding Congress, also held in London, namely, in 1930, which, as we well recall, followed a first convulsion that had dramatically interrupted at the very outset the Congress opened here in 1914—our first duty is to extend a sincere and heartfelt greeting to all our colleagues from overseas to this Congress.

There are profound differences when we trouble to look just beneath the surface. These differences again augur well, on the one hand, and augur perhaps not so well, or even ill, on the other. It is our obvious task to join in sorting out among all these differences all that augurs well—for ourselves as a united profession, determined, as we must be determined, to serve the common cause—which is that of the well-being and stability of peoples, not only in our

own country, but, as must be, if we ourselves are to enjoy tranquility, of all peoples throughout the world.

For long, we as a profession in this island, to the shame of the country, as was rightly said in a memorable address delivered in the year 1923 by the great President of the preceding London Congress, the late Sir John McFadyean (1853-1941), for its real knowledge of the truth in matters pertaining to our own essential craft, had to subsist on "crumbs that fell from Continental tables." It will be our pleasure in the following pages to recall how the energetic reformer George Fleming (1833-1901), who founded this journal in 1875 and conducted it single-handed for the next twenty years, employed his remarkable gifts of clear and vigorous expression to gather up those "crumbs," not only for the benefit of his own profession but for the enlightenment of authority that sadly stood in need of enlightenment. That period has been truly described by that discerning eye-witness of its progress, our greatly esteemed French colleague, Emmanuel Leclainche, who is happily still alive and who has participated more actively in successive Congresses than any living individual, as the "Golden Age of Veterinary Medicine." It saw the emergence and triumph of Pasteurism. As Leclainche has correctly said, too, it was from his veterinary compatriots, those who bear illustrious names in our own annals—Chauveau, Bouley, Nocard, and others—that the immortal Pasteur himself was to derive the main support that led to the triumph of his doctrine. It was *not* from his medical compatriots. His veterinary compatriots were quick to perceive the meaning of his doctrine in so far as it illuminated what to them had been so long obscure and was of prime importance in our attitude towards all disease, namely, how to PREVENT it. His medical compatriots were reluctant—and reluctant because of the common human failing of being "interested," to depart from the age-long attitude towards disease, which was to conjure up a CURE.

The very first article published in this Journal, in July, 1875, by the late William Hunting (1843-1913), entitled "The Increase and Prevention of Glanders," heralded the change of outlook, which was afterwards jubilantly proclaimed as firmly established when Fleming published his editorial article in December, 1888, entitled "The Triumph of Pasteurism," commemorating the opening of the new Pasteur Institute at Paris on Wednesday, November 14, 1888, by the President of the Republic. That was a milestone, we realise now, in the history of civilised endeavour; for it was an event that not only marked acceptance of a changed philosophy; but, as with the opening of the first veterinary school at Lyons in 1761, which was the forerunner of all institutes devoted to *study* of the means to preserve health and cure disease in the animal creation, so it was that the founding of that institute in Paris in 1888 was the forerunner of all institutes to *investigate* the truth concerning disease, without which truth there can be no serious study. "Every year," Fleming then said, after recounting briefly the almost insuperable obstacles Pasteur had had to overcome, "adds to the splendid edifice of micro-biology which Pasteur has founded, and to which he and others are continually adding; and we cannot doubt that, having now completed arrangements for a more vigorous and complete course of research, great benefits will be incessantly conferred upon mankind by the work done in

his new laboratories. France now stands far ahead of every other country in the encouragement she gives to science, and though investigators of the Pasteur type cannot be created by State intervention—for, like the poets, they are born, not made—yet the State can aid and encourage them in their mission, which, but for this countenance, might be only imperfectly fulfilled. All men who love science and admire scientific work, especially that which tends to benefit mankind and animals, will award their congratulations to one of its most illustrious representatives, M. Pasteur, on the signal progress he has made in developing the particular branch of human knowledge with which his fame will be always intimately associated, and will earnestly hope that his life may be long spared to preside over the institution which bears his honoured name."

It was over thirty years later, in 1912, that authority in his country, but then taking the form of one of the strongest and most enlightened Governments of modern times, was awakened to the need of creating a similar institute, namely, the Veterinary Laboratory, Weybridge, for the special study of disease in its animals. Why did it take so long? For the animal stock of Britain had been rightly acknowledged supreme in the world, the great plagues had been brought under control or most of them totally eradicated by measures such as only an instructed veterinary personnel could conceive, and still there was immeasurable loss through persistence of disease.

That question has now been answered, if only by the support which the Government is giving, almost as if by way of atonement, by sponsoring, against all precedent, the present London Congress. Let us freely acknowledge it, and duly express our gratitude. That augurs well.

But then again we may ask, who was it could write as Fleming did, and when he did, as it were, prophetically? Have we now many more who can write as he could write upon a phenomenon of surpassing interest to us in shaping our courses? Was he a product of a system handsomely endowed through public funds? No. He was, too, like Pasteur himself, a son of toil, who himself had had to fight his way through great obstacles, as many others, Dick, McFadyean, and the rest, who it is said in the short preface to the Prospectus to the present Congress, have given from Britain, in spite of all handicaps, to the growth of veterinary medicine in the world "much that is native to it." And it is here that we may possibly be, or may become, lacking. For, as was said as far back as 1892, in opening a discussion at a meeting of the National Veterinary Association (*Veterinary Journal*, 1892, *35*, 442) by that revered figure and greatly respected teacher, the late Professor James Macqueen (1853-1936): " . . . We want study, not the study of books so much as the study of cases; we want observers, men of large natural and trained experience, or to put it in another form, we want more Dicks, with Percivall's power of the pen; we want more George Flemings to give us the best of other countries; we want more McFadyeans to sift the pathological chaff; we want more honest John (Henry) Steeles, to epitomise the whole; we want men more skilled in investigation; we want men of aptitude, men of honesty of purpose, men of zeal, character, men of vigour and of will; we want men who will bring education, experience, and discrimination to bear upon the everyday work of

life . . ." We could not have found words better to express, at this day, the spirit which we hope to be shown to animate this present Congress. Let us not, with the fostering of the State conceded to us at last, evince by our mood and actions that our spirit has become deadened, and that our good-neighbourliness towards our guests is less warm!

The milestones represented by congresses, jubilee or centenary celebrations, and so forth, provide occasion for, above all else, exchange of information, all in a frank and cordial spirit; they give occasion, too, as we have said, for that display of good-neighbourliness, as ought always to be displayed by those who are engaged, perhaps otherwise working in seclusion and remote from each other. upon a common task; and, they give occasion, too, for us to take stock of ourselves—what we have done, what we can do, and what still more we can do.

Such as we, in Britain, have been, how we have emerged as an educated body, and what our guests from overseas may hope to find in us—perhaps finding in us much that is not easy to understand at first—has all never been so well expressed as by the ardent spirit who was the founder of this Journal. Writing editorially in 1891 (*Veterinary Journal, 32,* 24), the centenary year of the foundation of veterinary education in Britain, Fleming says:

"This year is the centenary of the Royal Veterinary College, the mother—it might be said—of all the schools in English-speaking countries, and the occasion should not pass away without some evidence that the event is of more than ordinary interest. Centenary celebrations of Veterinary Schools have been somewhat frequent lately, the sudden and wide-spread impulse given to veterinary teaching by the great success of the Lyons and Alfort Schools more than a hundred years ago, having led to the establishment of others in nearly every European country before the end of the last century. The Vienna, Berlin, Hanover, and Munich Schools have had their hundred years' anniversary, and before this century terminates nearly all the Continental schools will have entered on their second century of existence.

"How the centenary of the Royal Veterinary College should be most appropriately celebrated is chiefly for the Governors and the teaching staff to decide; but that the profession should recognise this unprecedented occurrence in some fitting way cannot be a matter for doubt. We are not usually a very demonstrative people, and generally prefer to allow our celebrations to pass over quietly; in this respect differing widely from our neighbours across the Channel, who see in an event of this kind an opportunity for displays and pageants which we might consider rather grandiose and exuberant.

"But we are none the less hearty in our recognition, if we are less inclined than our neighbours to theatrical shows; and as this year gives us a professional centenary to celebrate—an event which none of our predecessors witnessed—we ought to make an effort to mark it in a worthy and significant manner.

"The school really owes its commencement to a Frenchman, Charles Vial—a refugee from the terrible revolution in France—who arrived in this country when an Agricultural Society was about to send one or two young men over to that country to study at the Alfort School. His arrival obviated the necessity for this mission, and a small beginning was made in teaching them at home, by the Odiham Society—in conjunction with a few noblemen and gentlemen interested in the welfare of horses—starting a small school in Camden Town, into which M. Vial was installed as teacher. Several distinguished surgeons and physicians lent the school their patronage and assistance, but the premature death of Vial was a serious blow, which was only compensated for after a time by the appointment of Coleman, who had unfortunately nearly everything to learn with regard to veterinary medicine and surgery before he could profitably instruct.

"The history of the school, in connection with the progress of veterinary science, has been already dealt with at some length in the pages of this Journal; so that further reference to this subject is unnecessary. It is a matter for discussion whether it would not have been better for the nation to have recognised the value of a veterinary school a hundred years ago, and instead of leaving it to be commenced and kept up by a few private individuals, to have founded and maintained it as a national institution, worthy of the country and of medical science, as other nations—rich and poor—did. Certainly, the struggle for existence was long and severe, and the advantages veterinary science can confer were long postponed, and are, even now, only partially realised by a people

who had far stronger reasons for encouraging its development than France, Germany or Austria. It makes one blush to visit the Continental schools, and see the position they occupy, and the support they receive from the governments of the countries in which they are located, and then to compare them with our own. The only consolation to be derived from the comparison is, that if these now magnificent schools had been commenced as the Royal Veterinary College was, and left to contend against poverty and prejudice as it has been, they would probably have succumbed long ago. Therefore, although we cannot boast of such a splendid school as those of Alfort, Berlin, or Vienna, we can at least assert that the London College is typical of the British people—independent and self-reliant, energetic and determined. Whatever pride we take in the possession of these qualities, which have kept us well to the front in the competition of nations, we may justly manifest in a professional sense, in estimating the course to adopt in celebrating the Centenary of the first Veterinary School in English-speaking countries."

It took another fifty-seven years for the Government of this country to confront squarely the issues arising in the above quotation in the manner which from the outset had been adopted on the Continent of Europe. That was with the passing of the Veterinary Surgeons Act, 1948. Whereas, on the Continent, those schools arose and were endowed through the autocratic sway of Rulers or States, here in Britain nothing in that way could take shape until public opinion expressing itself ultimately through Parliament was moved to the necessity for action. That is why we may seem to have lagged; but, since a beginning was made in State recognition, which only came about in partial effect with the creation of the Development Fund in 1910 (there being no machinery in the British constitution for the financing of enterprises of this kind until then) we have made such headway, we believe, that it can be truly said we are no longer the mere partakers of "fallen crumbs." At this Congress we hope to show that in our turn we have now something that is substantial to offer from our own tables to those of our brethren from such countries as have been our hosts in the past, and still more to such other of our brethren from those countries that are still fledglings and whose nurture it shall ever remain, whenever they call for it, our fond concern.

II. THE FOUNDER OF THE CONGRESSES: HIS MISSION AND HIS DISCIPLES

In our highly esteemed contemporary, *The Veterinary Record,* there has appeared in the issue published in the week preceding this Congress a short article entitled "The International Veterinary Congresses: Their Origin and Intentions," The author refers to the founder, John Gamgee (1831-1894), as "the greatest genius the British veterinary profession has ever produced." Such an estimate can only be reached by a man's posterity, when the searchlights of the historian cast their full glare into the past to detect through its obscurity any figure that throws back a luminous reflection from the distance. That estimate was already implicit in the writings of the great British veterinary historian, the late Sir Frederick Smith. It becomes explicit with still continued historical research, and with means to assess that were not given to Smith himself who never attuned himself wholly to the transition already dealt with that was represented by the advent of Pasteurism. The good Dick was to him still a hero, though that wonderful figure in our history was never capable of conceiving any idea that related to disease as a phenomenon to be countered by

PREVENTION rather than CURE. It was in his complete readjustment of ideas to the change that must take place that Gamgee not only could not agree with Dick but set up, at great personal expense, in Dick's native city of Edinburgh a rival school to propagate the new gospel. And there during the few years that the school remained in existence, from 1858 to 1865, Gamgee expended almost superhuman energy in his endeavours to convert his own profession and authority in this country to his views. Undaunted by the obstacles set up against him by various interests and even by his own profession, which as Smith rightly states was passing through a bad phase in our history, which despised all real learning and search for truth, he convened in 1863 the first Congress at Hamburg so that men on the Continent eminent for their experience and enlightenment should come together to voice their collective wisdom on the grave situation which was bound to arise if his counsels passed unheeded. This was followed by the enlarged Congress which met only two years afterwards, in 1865, at Vienna. The proceedings of these two congresses were afterwards published as an appendix to his classic, "The Cattle Plague." Soon, calamity, as predicted, had occurred, and the country was wholly unprepared. From his contemporaries and in his own country, as with all real genius, Gamgee received no token of recognition or of gratitude. But his influence has spread down to us, not only through his works, but through his disciples, who were destined to leave their mark on at least two of the great English-speaking countries. One of these, William Hunting (1843-1913), is the figure already referred to familiar in our own British history. The other, James Law (1839-1921) is not so well known to us perhaps as he ought to be in this country, but he has left, as is better known to our American colleagues, an indelible mark in the founding and on the development of the veterinary profession in the United States of America. A worthy tribute to this great pioneer was published in this Journal in 1908, on his retirement from active work (*Vet. J., 64,* 273).

We can leave it to one of these two disciples*, therefore, writing in 1892, that is in the full-tide of the transition, to speak as is then recorded in the pages of this journal, of the change in outlook forecast by him, which gives, as we can discern now, even far better than then, the stamp of genius to John Gamgee:—

" . . . Until 1866, very little was attempted by veterinarians outside the *cure* of disease. What little advice was given as to prevention, was given gratuitously, and accepted at its proper value. No attempt at organised prevention had been made, and no one seemed to have recognised the possibility or the importance of preventive medicine as a special branch. John Gamgee, of Edinburgh, had for years been crying in the wilderness and endeavouring to awaken men to a true appreciation of contagious diseases. Budd, of Clifton, in the medical profession, had also grasped the nature of typhoid and the

* Hunting, W. (1892): The Veterinarian: His Position and Prospects. (An address discussed at the Meeting of the National Veterinary Association, held at Glasgow on August 3, 1892). *Vet. J., 35,* 195.

probable methods of spread of it and other diseases, and was the pioneer of preventive medicine. These two men—one in our profession, one in the medical—stood alone. In 1866 came the cattle plague, which rapidly spread throughout the kingdom, and decimated our herds of cattle. It caused much less loss than the two plagues, "pleuro" and "foot-and-mouth," which had then harassed our farmers for thirty years; but it was more terrible and more striking in that it spread rapidly, developed almost immediately, and was certainly fatal. Suggestions flowed in from all sides. Magistrates, clergymen, and gardeners all offered their advice; but perhaps no class put forward such voluminous and such erroneous theories as the medical men. Our advisers agreed only in one thing, viz., that the great want was a *cure*. Veterinarians can look back on those days with comparative satisfaction. We did not all know the nature of the plague, and the best way to treat it; but as a profession, we advised slaughter in conjunction with other measures necessary to stamp it out. Our advice was acted on, and it was successful in practice. A Veterinary Department of the State was formed, and thus the profession had its greatest acknowledgment as a body useful to the protection of the nation . . ."

III. VETERINARY JOURNALISM: THE BACKGROUND TO THE FOUNDING OF THE VETERINARY JOURNAL, ITS EARLY MISSION, AND THE MAIN FEATURES IN ITS EVOLUTION.

Also in our esteemed contemporary, *The Veterinary Record,* in an article published in its issue of October 16, 1948 (*Vet. Rec., 60,* 498) the present writer dealing with "The Veterinary Press: its Origins and Present Trends," has depicted the evolution of our veterinary journalism as falling, in accord with what had been already detected by our American colleagues, Merillat and Campbell, into three fairly well marked but overlapping phases. Furthermore, of the many journals that had failed to survive, their disappearance could be traced to failure to readjust themselves with vigour sustained to the march of events which demanded change in phase. Those three phases were, briefly, those of (1) Emergence, in which the pages of the journal as yet spoke, as it were, to no well-integrated professional body, but were written in such a way as to be intelligible almost equally to a lay as well as to a professional public; (2) Integration, in which the pages spoke in a language intelligible to what had now become a well-educated and integrated profession using its own terms, but as yet not differentiated, and not demanding expression of news, views, and information in diverse ways; (3) Specialism, in which an urgent call was now made for well-differentiated expression, in the shape of either news of topical professional interest, reviews of current progress, or systematic recording of experimental or field observations in a well-ordered and permanent form, usually within a restricted region of professional activity. It is obvious that no one journal in an expanding profession could hope to deal with all that was to be recorded in the last-mentioned phase. It must, therefore, if it has come down from an earlier one, realign its policy, or inevitably cease to appeal to its readers, and then, sooner or later, become defunct. The above sequence of

phenomena is best observed to occur in the German periodical literature, which at all stages, until recently, has been the richest and most prolific.

The Veterinarian, the monthly journal founded in 1828, appeared somewhat towards the end of the first phase mentioned above. Under the gifted editorship of William Youatt and William Percival, it reflected the aspirations of a rising profession, striving to emancipate itself from the fetters which had bound it almost from the inception of veterinary education in this country in 1791. A first step towards that emancipation was the obtaining of the Charter of Incorporation in 1844. But there were many other ways in which progress was hindered; and, contrary to what was happening on the Continent, where the well-endowed State schools staffed with a galaxy of talent were pouring forth a rich new literature, it was the town and country practitioners in Britain, and not, as had been intended, the schools, that were to provide the knowledge upon which a sound vocational teaching could be imparted. Though, in 1841, Youatt blundered somewhat by failing to observe that the information which he was gathering was destined for an advancing profession and not for general lay consumption, and thus lost the support he had received from the publication of reports of the then existing only veterinary society, nevertheless, until the death in 1854 of Percival, who took over from him at his own death in 1847, *The Veterinarian* fulfilled its original mission faithfully as an organ devoted to the best interests of the veterinary profession in Britain. Thereafter it fell into the very hands of those interested parties who had kept professional progress in check, namely, the staff of the London school, and, as has been now often recorded, it became lifeless and eventually perished, unlamented, in 1902.

The Veterinary Journal, founded by George Fleming in 1875, appeared when the second phase had got well under way. There was no question now, as is evident from the outset, but that its pages spoke to an integrated profession. As in the founding of the Central Veterinary Society in 1870, Fleming had a sure instinct as to what would arouse practising veterinarians to a sense of cohesion when all others of his contemporaries had hitherto failed. That was to keep away from any airy expression of ideals, keep entirely to matters pertaining to objective vocational practice, and suffuse on his part into all his enterprises the degree of mental and physical energy calculated to leave no doubt in the minds of his contemporaries regarding his determination and purpose. Having, for the writing of this introduction, read all the forty volumes issued half-yearly under his editorship, and having been well forewarned regarding all his limitations, we have no hesitation in declaring them now to be among the greatest treasures of English veterinary literature. It would be impossible to exaggerate the effect they must have had within that long period of twenty years, not only in moulding veterinary opinion when that was sadly and urgently needed, but also in guiding authority in this country into proper courses to deal with the many grave problems that then persisted in the shaping of State policy to suppress the several major scourges still threatening the animal wealth of the country. We shall need to revert at somewhat greater length to

this phenomenon. But so far as our own professional integrity is concerned we must state at once what he achieved. In conjunction with perhaps the best friend the profession has ever had to enter it from the outside world, Major-General Sir Frederick Fitzwygram, Bt., who most opportunely was elected President of the Royal College of Veterinary Surgeons the very year (1875) Fleming launched his journal, the profession was first saved as a corporate body from complete shipwreck through the insidious attempts of the teaching schools, acting in defiance of a long moribund Council, again to obtain dominance over the profession by obtaining Charters enabling them to grant their own qualifying Diplomas. Secondly, within Fitzwygram's long term of four years' office as President, the powers which the Council already possessed under the 1844 Charter to prescribe the curriculum of teaching at the veterinary schools were enforced at last. And so a desultory teaching lasting rather less than eighteen months was not only lengthened to three full academic years, but the precise manner in which that teaching was to be imparted together with the tests conducted as to its adequacy as determined by direct examination of students was all enforced in such a way as to give the profession itself the controls which it had always possessed, but had never properly exercised, to ensure its own supremacy under the original Charter. Thirdly, though under the Charter the title of veterinary surgeon was restricted to holders of the diploma of the Royal College that important reservation in itself carried no legal authority to enforce it. For no penalty can be inflicted upon a British subject against infringement of any reservation unless that has behind it the will of the people as expressed by Parliament. Somehow, the profession had been slow to realise this limitation, although it was clearly expressed to the promoters which had taken action from 1839 onwards that it was but a "first step" in their emancipation to seek a Charter, as an essential preliminary to obtaining their full rights which could only be granted by Act of Parliament. Meanwhile, a large body of non-qualified practitioners had grown up whose rights could not be ignored in equitably laying down restrictive safeguards. Alone and unaided, supplying the necessary funds entirely from his own pocket, Fleming, once he had perceived this point, pressed forward until the necessary legislation was obtained, in face of formidable opposition, with the passing of the Veterinary Surgeons Act of 1881. He was largely relieved, as is well known, by an enlightened Government taking over his draft Bill as a Government-sponsored measure and by the sympathy extended by the R.S.P.C.A. But in the re-drafting of the Bill, as was afterwards perceived, the full protection against infringement of the title in all manner of circumstances as anticipated had not actually been obtained. This incident has been well dealt with in an address given by the late, much-beloved Secretary of the Royal College, Dr. Bullock. (*Vet. Rec.*, 1943, *55*, 73). Nevertheless, what was then achieved confirmed the supremacy of the profession in the management of its own affairs and enabled it gradually to exact a code of internal professional discipline.

To our visitors from overseas this procedure which step by step, at intervals of a full generation or longer has brought us to a position such as they have enjoyed from the outset, may seem strange. However,

there can be no question but that in the end it brings us to a position resting on moral foundations that make for formidable strength. The great reforming movements are, as is seen, both from the history of the Charter and of the Act, not engendered so much by collective enterprise as by singularly gifted individuals, whose names are then soon forgotten by succeeding generations, and it is left to the historian to trace to whom we owe the privileges that have been won for us. Thus, entering the "Mecca" of the profession at 10, Red Lion Square, the visitor may pause to gaze on his left at a large brass plaque on which the names are engraved of a number of men to whose memory on the occasion of the Charter Jubilee the Council of the time, forgetful of all that had happened in the interval, desired we should express "gratitude." To some of them we owe no gratitude, but the reverse. To none does posterity owe that lasting homage which, in the lifetime of the individual, humanity usually rewards by crucifixion. Moving onwards, the visitor will notice on his right and left some melancholy faces which are those of some of the men whose names are engraved on the plaque and who, as is testified abundantly in the records of the time for anyone who bestirs himself to search through them, did their best, "almost as soon as the ink was dry upon it," to wreck the Charter when they came to appreciate that their personal interests stood in danger through the enforcement of its provisions. Then proceeding up the stairs to the Council Chamber, on either side of its wide portal there are suspended, as if keeping guard over it, two large paintings of men whose countenance and figures display a different aspect—an aspect of energy, zeal, and determination. Those qualities shine out from them in common. We truthfully owe them much for those qualities. The one on the right, however, is that of the aristocrat who in defiance of the prejudices of the time did not feel it "beneath" him to enter our profession, and, when he had done so, to give it of his best—General Fitzwygram. The one on the left, on the other hand, is that of the man who as a boy the much respected veterinarian John Lawson of Manchester, later an esteemed President of the Royal College, had detected in his forge as having outstanding promise and had him sent to Dick's school in Edinburgh for training. Thereafter, as our historian Sir Frederick Smith has said, throughout an adventurous career, culminating in his becoming Principal Veterinary Surgeon to the Army, "his pen was never idle," and it was always to place at the disposal of his profession in Britain all that was being added in knowledge in the world that would promote its advancement, and in which duty the schools themselves had dismally failed. During his twenty years' editorship of this journal no distinct falling-off in the quality of his writing in it can be detected, though the effort must have taken much toll of his resources, and later pictures of him depict, largely as a consequence, a wearied and somewhat harassed look. No doubt, therefore, when in 1895 he threw down the editorship he felt it was beyond his resources to carry the journal forward to the concluding phase. Throughout he seems to have been backed handsomely by the publishers, and in particular, by the senior partner, Mr. A. A. Tindall, who died in 1931 at the venerable age of 91 years.

The year 1888 was to see the birth of two journals which clearly showed

that the time was already overdue for transition into the third phase, namely, the weekly periodical, *The Veterinary Record,* by William Hunting, destined to keep the profession acquainted with the class of news that could not be satisfactorily transmitted to it in a monthly journal; and the quarterly, *The Journal of Comparative Pathology and Therapeutics,* founded in Edinburgh by John McFadyean, then himself changing over his interest from normal anatomy to morbid anatomy, in the Virchow sense, and equipping himself to take full advantage of the rise of Pasteurism that was soon to make itself felt by the supplementation of that subject with Bacteriology as, it was believed, in the light of the discoveries then rapidly succeeding upon each other, all that was necessary for the final elucidation of disease.

Fleming, indeed, from the outset had given *The Veterinary Journal* the sub-title, *" and Annals of Comparative Pathology,"* and had continued throughout his editorship to employ this sub-title. Even earlier, in designating the long contemplated London Society which came to life eventually under his ægis as the *Central Veterinary Society* in 1870 the alternative idea had crossed his mind to name it a *Society* or *Association of Comparative Pathology.* "Pathology," however, at this time, and even later on the Continent, connoted rather a more scientific approach to the study of disease than the traditional, and empirical, method of simple clinical observation. No sharp-cut line demarcated it from Medicine and Surgery, except that in its outlook Prevention was stressed as a feature no less important than Cure. Fleming himself, remarkable though he was in his competence within the field we would now assign to the Epizootiologist, was not equipped to deal with the advances made within the more specialised field, as it was rapidly coming to be, of what we would now call Pathology. Neither was he temperamentally fitted, as Hunting was, to be a purveyor of topical professional news, because, as Smith has said, one of his serious limitations was that he could not readily tolerate opposition to his own views and in that Hunting revelled. In that respect, Fleming's fellow-Scot, McFadyean, also was disposed to exhibit unyielding combativeness and early somewhat violent sallies against him by the younger and equally ambitious man had, most unfortunately for our literature, prevented them joining hands to transform the existing *Annals* into a medium that would take full cognisance of the necessary transition to what we would at this day call *Comparative Pathology.*

" My feelings towards him," said Hunting once about a man who had lost his head and become embittered in controversy, "are no more unkindly than those of gentle pity." There was not a great deal of " gentle pity " left in the soul of either Fleming or McFadyean when they fancied anyone stood in the way of their ambitions; and it was this lack, as we can now better perceive, which blocked the way so far as our own journalism is concerned against smooth transition from pre-Pasteurism to post-Pasteurism.

It is, at any rate, clear that before Fleming abruptly laid down his pen in 1895 the time was already overdue for transition into the third phase, and for temperamental reasons this process was not then achieved. Instead, choice of

editorship fell on that excellent clinical teacher and writer of text-books on veterinary and surgery of the early second phase, Professor William Williams, Principal of the New Veterinary College, Edinburgh. He was assisted by his son, Professor W. Owen Williams, who took over the editorship on his father's death in 1900. On transference of the New Veterinary College to Liverpool University at the end of 1904, change of editorship again occurred with the issue appearing at the beginning of 1905. The Journal certainly preserved to a large measure its dignity of appeal during the Williams's régime, but the keen critical insight and alertness to current trends so highly characteristic of it during the long Fleming period had diminished. However, perhaps one of the most significant features, at any rate towards the end of the son's period, was the stressing of the need for closer association with the University system, long before the profession as a whole, which had had to fight hard, championed by Fleming, to assert its own authority over a woefully non-co-operative school system, was prepared for it.

An interesting figure appeared just before the end of the Williams's régime to lend a hand, in the person of a polished writer, Colonel Joshua Nunn. It was he who saw clearly the need for dissociating the "News" feature, including Society reports, from the *Journal,* and started the weekly *Veterinary News and Bulletin,* as it was first called, though his name did not appear in it because of his official position in the Army. By now, however, that is, early 1905, *The Veterinary Record* had had a good start in Hunting's hands; and so it was difficult to overtake it. However, there seems no reason why that could not have been done, but for one incident which proved an insurmountable obstacle. Edited until he left for Melbourne in 1913 by the rather youthful Professor Woodruff, and afterwards successively by the gifted and mature veterinarians, E. Wallis Hoare and Henry Gray, while at that time Hunting's own powers were declining and the burden of the *Record* was really shouldered by his printer, Mr. Brown, of the Fulham Road, there was no doubt but that the *News* was making an appeal rivalling that of the *Record.* And, in any case, as with the two great British medical weeklies, it is recognised as entirely wholesome for a news periodical that another should be in circulation in a relation of friendly rivalry. However, when the *Record* appeared, at the beginning of 1921, as the official organ of the reconstituted National Veterinary Medical Association of Great Britain and Ireland, entitling all members of that body to receive a copy, the *Veterinary News* had, perforce, to cease to appear.

The *Journal,* now, after the publication of a weekly news supplement, *The Veterinary News,* had begun, appeared in one-yearly volumes. For several years, from January, 1900, the volumes were numbered as a New Series, the sub-title given to it by Fleming having been dropped. However, later, in 1921, the practice was reverted to of numbering the volumes simply from the date of first publication, in 1875.

After Owen Williams had relinquished editorship, the task was taken over, that is, in 1905, by Hobday, who continued in that capacity until his death in 1939, when it passed into the hands of the present editors.

At the beginning of the Hobday régime, an attempt was made to increase its editorial representation and denote its scope by reintroducing a sub-title, "*An Anglo-American Review of Veterinary Science,*" with Professor G. H. Woodridge, then in 1906, a young professor at the newly-opened Dublin school collaborating in the interests of Great Britain and Ireland, Colonel Joshua Nunn, who had then taken over the post of Principal Veterinary Officer in India, representing India and the Colonies, and Professor W. L. Williams, of the New York State Veterinary College, representing the United States of America. In 1910, however, the sub-title was shortened to "*A Monthly Review of Veterinary Science,*" as it stands to-day, Nunn having then died and W. L. Williams no longer able to continue in the work, while Professor Gilruth was appointed to represent Australasia. Afterwards, in 1916, Hobday was left alone and then took on Gladstone Mayall to collaborate as sub-editor, 1917. At the end of the 1935 volume, Hobday inserts the note: "It is now thirty years since I took over the Editorship of the *Veterinary Journal,* and the time must come when others must help in the responsibility of carrying on the work which is done by this, the oldest British journal of the kind." [Of the forty veterinary periodicals now taken in by the R.C.V.S. library only two have an unbroken longer succession, namely the *Receuil de Médecine Vétérinaire,* Paris, founded in 1824, and the *Annales de Médecine Vétérinaire,* Belgium, founded in 1852. The *Schweizer Archiv für Tierheilkunde* also has an earlier history, but it is a broken one, the present journal dating back to 1879 only]. "To my loyal colleague and friend," Hobday continues, "Mr. Gladstone Mayall, who will still occupy the sub-editor's chair, I take the opportunity to offer my expression of deepest gratitude; and the staff will be strengthened by the addition of collaborators whose names will, I am sure, when announced, be received with approbation by our readers." The names when announced were those of Amoroso, R. Hudson, J. McGunn, W. C. Miller, and Dunlop Young.

In that year, 1932 (p. 2), Hobday uttered editorially a plaintive *cri de cœur.* "*. . . Never was there a time when the study of veterinary science in every field was more important than now, nor when there were more problems to be solved: and never were there fewer men willing to put their hands to the plough. . . .*" In such low ebb was veterinary medicine during that dreary phase in our history that the great McFadyean, then become an old man of 82, retorted in 1935 to a grandson who had voiced a wish to enter it as a career: "You had better put that out of your mind at once: the veterinary profession has now sunk about as low as it can ever sink." Hobday's sad plaint in 1932 might equally well have been couched in words reminiscent of those quite recently used by another great man: "*Never before in the history of veterinary endeavour has such great havoc been wrought to it everywhere by so many small men.*" Let use therefore hope, by what we do at this Congress, we can show to the world there has since been *here* a strong turn of the tide! We may look forward, at any rate, that under its present management this *Journal* will again point out, as long ago, the way to redemption.

IV. THE VETERINARY JOURNAL: SOME FEATURES IN ITS HISTORY WHICH ARE PERTINENT TO THE PRESENT WORLD SITUATION

FLEMING obviously derived his main inspiration from study of the contemporary French literature, as did Liautard during his long tenure of editorship of the *American Veterinary Review,* later to become the *Journal of the American Veterinary Medical Association.* He obviously, too, was unaware of the rich contemporaneous outflow of German literature, being unacquainted with the German language. Nevertheless, the French school of journalism was then at its wonderful best in the competent hands of Henri Bouley. His successors were not at home in any language but their own, and then rather uneasily. McFadyean, on the other hand, had striven hard to gain some mastery over both the German and French languages, in which the riches of the period were in currency. With the change in situation that has occurred since the first World War resulting in the prolific output in the English language on both sides of the Atlantic and the sharp decline in output and quality of the Continental literature, a younger generation may not be readily impressed with the urgency there was formerly to have a working knowledge, at any rate, of the German and French languages. But in those days it was a necessity without which no veterinary writer could even pretend to be well informed. It is hard to discern now any unwarranted plagiarism in Fleming's editorial writings, for most of his texts were clearly penned to match the British scene. Already in text-book writing he had displayed extraordinary fertility, but, as Smith has rightly said, he was often tempted to venture outside the range of his own immediate experiences and so the evidence of direct "lifting" was much stronger. In any event, for his journal he had chosen excellent models and so compelled the attention of his readers.

No one except such as has had editorial experience of the miserable "copy" forthcoming from British contributors a little more than a generation ago can appreciate the feat accomplished by Fleming in eliciting for publication contributions of an even high standard from all over the British Empire, as it was then, and in preparing good critical reviews of the available books and reports and in his summing-up of current problems in well pointed editorials. The response was immediate. The circulation of the journal exceeded all anticipations. Not only in England, but also in America there was a real thirst to be quenched among the long parched multitudes there of professional readers. So long as he himself poured forth this refreshing beverage there was no lack of consumers.

In introducing the sub-title "*An Anglo-American Monthly Review of Veterinary Science*" in 1905, the management was probably mindful at first of the extensive regional reputation which the journal had acquired in Fleming's hands as a real review both in the United States of America, as well as at home, of all scientific progress bearing on the veterinary art, not appreciating that by then a sufficient indigenous American literature had appeared. That pretension

to the journal being a "Review" has not been dropped even though very little of its contents, except a short editorial article, is now devoted to reviewing problems of veterinary interest whether they be "scientific" or otherwise.

In the circumstances prevailing, there would be every excuse, allowing even for the most accomplished fertility and versatility on the part of the successive editors, for discontinuance of the sub-title.

Readers are specially referred to the valedictory editorial published by Leclainche in 1936 in the concluding volume of his *Revue Générale de Médecine Vétérinaire,* founded by him in 1903, to appreciate the enormous difficulties confronting any editor who proposed to supply his public with a proper review of all current veterinary developments during that particular period. A generation earlier it was not beyond the alert mind of a Bouley, a Fleming, or a Liautard to take clearly within his purview the whole field and perceive the several evidences of promising new growth sprouting up within it. A generation or two later there would have arisen younger men presumed competent to handle their own special plots.

Meanwhile, what was to happen to the busy practitioner wishing to keep abreast of all that pertained to his essential everyday craft? Fortunately, as again Leclainche has informed the present writer, there is not so much as is sometimes thought to have been accrued, when all is sifted out, that need cause the practitioner to alter so profoundly his manner of approaching the mass of his everyday problems. And it is none of his business in any case to test out for himself the value of any new procedure recommended until its worth has been established by all possible experiment by the specialists engaged upon its examination, and settled conclusions have been reached among them upon it.

Otherwise, to analyse the literature accumulating in such large mass even upon a limited aspect of the whole field, such as is now undertaken by *The Veterinary Bulletin* upon the field of Veterinary Preventive Medicine, is such a formidable task that only sponsorship by the State can provide the funds necessary to remunerate a staff employed upon an exhaustive analysis of the massive relevant literature. For, beyond what is published upon any specialised subject within the domain of what is connoted by the term "veterinary" by workers bearing veterinary qualifications, there is often an even far larger relevant output by workers who have ranged themselves within societies specifically devoted to advancing knowledge within that speciality, regardless of whether or not it has any veterinary applications whatever. And the numbers of those societies, as a senior veterinary worker who has endeavoured to retain an interest in the whole field of veterinary developments learns to his cost, have become almost legion. To retain a truly catholic interest in everything veterinary, as could be readily done by a cultured man of the Bouley-Fleming-Liautard age, has now become well-nigh impossible for a similar man embarking upon a veterinary career. Unless he early decides, therefore, upon the plot or plots he wishes to cultivate specially he is doomed to regression in "phase" such as manifestly characterised the successors of Fleming.

The position that must therefore now be faced, and faced boldly too, by

participants in this present International Veterinary Congress, is whether or not the traditional system of attempted comprehensive veterinary training is to be retained; or, dealt with, in the interests both of the State, which is now committed to supply the funds for the costly training, and of the trainee himself or herself, the span of life within which he or she ought fairly to remain under tutelage being limited, by total abandonment? And, if it is to be so abandoned, will much profit accrue by restricting the attention of trainees to one or a few of the many specialities upon many of which far more factual knowledge has been accumulated within the last few decades than was available upon the whole veterinary domain in the Bouley-Fleming-Liautard age?

For ourselves, the answer to this question must be plainly, no, the position must *not* be abandoned.

And we had already endeavoured to supply a reasoned answer to this question in an article appearing in this Journal in 1945 (*Vet. J., 101,* 10, 33). If the position has suffered shocks, it must be retrieved and now consolidated to withstand both internal and external shocks. And this must always be by directing attention primarily towards the *living* animal, or range of animals.

It was also most eloquently answered by Fleming himself, as it had been too by Gamgee and by Hunting when they pleaded that *the only way* in which the major livestock scourges threatening the livestock economy of this country could be eradicated, and were then proved to be eradicable, was by the adoption of drastic preventive measures such as were conceived only by veterinarians. While hailing jubilantly the triumph of Pasteurism, Fleming insisted that not only in the eradication of those scourges in which a vast amount of energy and money has since been expended in elucidating the properties of their infective agents as *viruses,* but also, in his hands, by adopting the same classic methods of eradication in the whole army at home, the horse population had been completely freed from the erstwhile major scourge of glanders, and that, too, some time before even we got to know of its *bacterial* origin and the use of mallein as a diagnostic agent.

It may be fairly contended, nevertheless, that there are vast territories in the world where those simple classic methods of eradication *cannot* be applied, and something more "scientific" (whatever that may mean) is then demanded than is within the reach of a "simple" veterinarian.

Before that contention is persisted in, its advocates are enjoined to a perusal of the contents of the preceding (July) issue of this Journal. Then, if they conclude, as well they are forced not to conclude, that anything was achieved, they can be assured that it was all conceived in the minds of the "simplest" of veterinarians.

This year the title of the Journal was changed to "*The British Veterinary Journal.*" Once again the old "V.J." sets forth into the unknown and difficult future under a new banner with, we are sure, the good wishes and good will of veterinarians in every part of the world.

J.T.E.

PROFESSOR EMMANUEL LECLAINCHE Membre de l'Institut (Académie des Sciences), Directeur honoraire du Ministère de l'Agriculture, from his position as Director of the Office International des Epizooties in Paris.

By G. FLUCKIGER

In spring 1948, Professor Leclainche expressed his desire to be relieved of his duties as Director of the Office International des Epizooties. He will be succeeded by Professor Ramon, Membre de l'Institut (Académie des Sciences), Honorary Director of the Pasteur Institute as from May 17, 1949.

Born on August 29, 1861, Professor Leclainche graduated from the Alfort Veterinary School in 1882, and for some years was in practice in the Department of Aube, from which he came. Practice, however, was not his true vocation. Teaching attracted him and he showed a strong liking for scientific and documentary research, subjects which are always closely related. His greatest desire was to be able to join the teaching staff at Alfort. Four years after leaving the school, he returned as Reader in medical and clinical pathology (1886).

In this post, in which there were no opportunities for experimental research, he pursued two lines of work which were then available, namely, clinical observations in the hospital "wards," where his duties took him daily, and research into literature to which he devoted most of his spare time. He applied himself wholeheartedly to the latter subject and began to acquire the fund of knowledge which he has never ceased to accumulate and which is responsible, in no small measure, for his fruitful and happy career.

Two years after he started teaching he was put in charge of the course in commercial jurisprudence and legal medicine attached to the Chair of Medicine, of which in the following year he betcame Chef de Travaux. During this preliminary period of contact, first with country practice then with clinical teaching, he reaped from consultations and hospital experience as well as from the library, a harvest of observations and facts. Of these some were published in the form of notes, studies or memoirs in veterinary or agricultural journals of the period: Archives Vétérinaires, then Recueil de Médecine Vétérinaire, Bulletin de la Société Centrale de Médecine Vétérinaire, later changed, thanks to him, to the Académie; Journal de l'Agriculture, etc. The Société Nationale d'Agriculture presented him with a gold medal for a treatise on "Calf Rearing in the Department of Aube." The store of knowledge that he gathered helped him also in the preparation of numerous articles for H. Bouley Reynal's "Dictionnaire de Médecine Vétérinaire," which shows in what esteem he was held by the directors of that important publication.

The first phase of his career was closed by his editing the "Précis de Pathologie Vétérinaire" (1891) (internal medicine), a standard work which both practitioners and students welcomed, especially since no other work on pathology had appeared for more than 30 years. This excellent little work which demonstrates not only his perfect knowledge of French and foreign medi-

cal literature but also his quality as a scientific editor and as a writer, is always remarkably to the point.

This period saw the full development of Pasteur's discoveries, and Edmond Nocard, one of the favourite disciples of that inventive genius, had created at Alfort a centre from which radiated the teachings and methods of the master. M. Leclainche had placed himself, as soon as possible, under the wing of the great "Alforien," of whom he was to become a disciple and, in 1891, they were jointly responsible for an article running to 120 octavo pages devoted to the "diseases of animals transmissible to man" in Rochard's "Encyclopédie d'Hygiène."

In the same year another important event took place. He was appointed Professor to fill the vacant chair of "contagious diseases and sanitary police" at the Toulouse Veterinary School. Having, at Toulouse, a chair and a laboratory, of which he was chief, with full facilities to pursue his natural bent, he could now devote himself fully both to teaching and to studying contagious diseases which henceforth formed the sole object of his research work. Whilst he was publishing the results of his work on glanders, tuberculosis, actinomycosis, botryomycosis, hæmorrhagic septicæmia, etc., in the Revue Vétérinaire de Toulouse and other scientific periodicals, e.g., C.R.S.B., Annales de l'Institut Pasteur, Médecine Moderne, Revue de la Tuberculose, etc., he accumulated material for the masterly text-book on the "Maladies Microbiennes des Animaux" which he edited in collaboration with E. Nocard in 1895. This work is a well-documented treatise on all aspects of the pathology of infectious diseases of animals as seen and studied from the Pasteurian viewpoint. Carecully edited and written in a straightforward, lucid style, it was a great success and was honoured by the Académie des Sciences. It is evidence of the reputation of the young professor who now had the sound basic knowledge and training necessary to tackle the study of various transmissible diseases.

Foremost among these diseases were swine erysipelas, gas-gangrene due to *Clostridium septicum,* and blackquarter, into which he carried out a series of investigations, the objective being the development of safe and practicable methods of prophylaxis and treatment. Thus were devised the serotherapy of swine erysipelas and of gangrene, active immunisation against swine erysipelas by the simultaneous method of Lorenz modified in that the serum-virus mixture was followed 10 days later by an injection of virulent culture and, from early in 1900 with the valuable collaboration of H. Vallée, serotherapy and vaccination against blackquarter. The last-named became the object of a long series of experiments lasting nearly 15 years and leading to the substitution for empirical methods of vaccination with impure, variable, complex materials by rational methods based on the use of a pure, attenuated culture of *Cl. chauvœi* either alone or together with specific serum (sero-vaccination). The use of sero-vaccination was designed to avoid the precipitation of blackquarter by the injection of the vaccine into animals harbouring a latent infection.

At the time that the third edition of "Maladies Microbiennes des Animaux" appeared and whilst engaged with Vallée on the work just men-

tioned, M. Leclainche founded the "Revue Générale de Médecine Vétérinaire" (1903). In this way he was responsible for the introduction to the veterinary press, both scientific and professional, of a fortnightly periodical summarising the French and foreign publication of interest to veterinarians. In addition to keeping its readers up-to-date on scientific and practical matters by original articles, general reviews and abstracts of periodical literature, this well-edited journal of high standard also included information of professional interest such as the recruitment of students, veterinary education, the welfare of veterinarians, and matters connected with the status and future of the profession.

Welcomed by veterinarians, the "Revue Générale" carried out the intentions of its originator before and after the first World War. However, difficulties due to the war forced its director to reduce its issue to once a month and, in 1936, M. Leclainche, fearing that the undertaking which he had conceived and carried out so well could not fulfil the role that he had intended for it, decided to suspend publication. It was with the greatest regret that the readers of this periodical saw the disappearance of a publication which for 33 years had served the veterinary profession with dignity and impartiality.

M. Leclainche had been led by a chain of thoughts and remarkable inspiration in the realm of serotherapy from the prevention and cure of gas-gangrene, a possible complication of wounds to the prophylaxis and treatment of blackquarter, another anærobic infection. Profiting by his earlier discovery of the beneficial action shown by anti-swine erysipelas serum injected with culture on local tissue, in strongly stimulating the defence mechanisms, he started in 1912 with H. Vallée the preparation of a highly active serum containing antibodies against the bacteria usually concerned in suppuration. This was his "specific polyvalent serum" and it was soon to be improved by the incorporation of two extra antibodies, those against *Cl. septicum* and *Cl. welchii*. The value of such a serum, not only for the local treatment of wounds and their sequelæ, but also in the prevention and general therapy of the septic complications of heavily infected wounds, was proved during the 1914-18 war. This serum has the advantage over even the most harmless of chemical antiseptics in that it produces physiological antisepsis by supplying the cells with specific substances of organic origin in a wholly-natural medium. By the improvement in local and general symptoms which follows its use, it has taken its place amongst the armaments available for combating wound infections.

Twenty years of teaching and of documentary and experimental research, whilst occupying the Chair of Contagious Diseases at the Toulouse school, had enabled M. Leclainche to acquire a clear idea of sanitary police measures and of the organisation of veterinary services necessary to give the proper drive and direction to the control of epizootics. It was to achieve this conception and to bring about the necessary reform in the service, so frequently demanded in the "Revue Générale" that the Directorship of the Disease Control section at the Ministry of Agriculture was offered to him in 1911.

Unfortunately, in accepting his new post he lost his laboratory in Toulouse. Later, in 1913, he was given the Direction of the Research Laboratory, erected at Alfort by Nocard and Roux, for the study of foot-and-mouth disease. This

made good his loss and enabled him to continue his work which now consisted of improving the methods of vaccination, which he had already studied and applied, of perfecting techniques and of examining their methods of application so that under all circumstances they should stand up successfully to the severe test of field application.

M. Leclainche kept the effective direction of the laboratory until 1920 when it was entrusted to H. Vallée, who retired from the directorship of the school of Alfort to devote himself exclusively to research. On the departure of M. A. Barrier in 1931, M. Leclainche assumed in addition to his duties as head of the Services Sanitaires, those of General Inspector of Veterinary Schools with the title, Chief of the Veterinary Service. He became also undisputed head of the veterinary profession to which, as well as to the central administration, he brought great credit.

Meanwhile he added to his achievements and to the weight of his duties by the creation of the Office International des Epizooties, of which he was made Director (1924). He has directed this great institution with a universally recognised authority and has placed at its disposal all his knowledge as well as his great personality. His annual reports on the world position in regard to animal disease, his original articles in the "Bulletin," his studies on the prevention of epizootics and his propaganda for modern sanitary police services are models of clarity. In them are to be found interesting ideas and suggestions which their author offers for the consideration of all experts occupied in the struggle against the contagious diseases causing loss amongst the flocks and herds of their countries.

During the 10 years of his directorship, thanks to his ability to surmount all obstacles and difficulties, to his authority and to his considerable influence, some very important achievements have been realised both in the teaching and professional fields. Firstly, the "Doctorate" was created by the law of March 28, 1924: state doctorate, university degree and professional title in one, the creation of which was received with enthusiasm and gratitude by French veterinarians for whom the legitimate title of "doctor" previously applied only to some, now became generally accepted. In effect this title enables the French veterinarian to enjoy full privileges as a citizen and puts him on the same level as a medical practitioner.

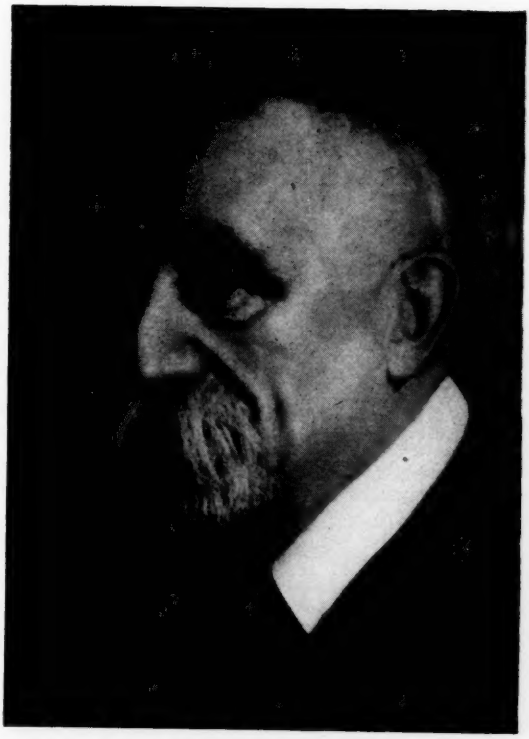
The creation of the doctorate emphasised the meaning of the "Establishment of Higher Education" title generally attributed to the veterinary schools but of which previously no official recognition had been given. It was the institution of the doctorate which justified the drawing up of a new decree to replace one which lapsed in 1903. The new decree of June 5, 1924, defined the character of the schools in concise form by a short statement: "The veterinary schools are establishments of higher education which function under the authority of the Minister of Agriculture."

What this phrase, written in an official document, a veritable plan for veterinary education and statute of the great teaching institutions, means is simply the creation within the cadre of agriculture of a body like the faculty of a University, and particularly like a faculty of Medicine, whose duty it is to

award the diploma of "Veterinary Doctor." The resemblance to medicine was further emphasised in 1925 by the creation of a Fellowship of the Veterinary Colleges comparable to the Fellowship of the Faculty of Medicine and, less than 20 years afterwards, was recognised in a more concrete way still by the financial concession of a pay-code identical with that of the staffs of the Universities. Finally, the change in status was realised without any change of régime, which was as the schools, which have even retained their old Greco-Latin name replaced in many foreign countries by that of the faculty, had wished.

Amongst the many important accomplishments of M. Leclainche there is one on which he concentrated, towards the end of his administrative career, all his creative ability and influential connections: the construction at Toulouse of a model, up-to-date veterinary school to replace that already in existence, the removal of which had been under consideration for a long time owing to development in the town. In 1929 M. Leclainche obtained the necessary funds for an approved programme based on his directives which can be summarised as follows: abandonment of the idea of isolated buildings, expensive to build and to maintain; grouping in the first block of (a) the administrative offices and such general services as library, museum and special lecture theatre; then (b) the laboratories and teaching services situated both on the ground floor and the first floor with lecture rooms at the junctions of the buildings; in a second block, hospital accommodation and animal husbandry installations; finally, separated from the rest, a hostel with 150 single rooms, refectory and kitchens, common-rooms and library, everything possible to make life easy and pleasant for the pupils. If one considers in addition, the lawns, gardens, trees and playing fields on the remainder of the 32 acre site, one can imagine what a fine, big institution the new school was to be. Its construction began in 1932 and should have been complete by 1935. In 1939 when war was declared, owing to difficulties which need not be mentioned here, it was still incomplete. It had reached the stage at which it was hoped to be able to proceed with the equipping of the buildings without much more delay. But when war was declared, work stopped. The school was empty, and when the Air Ministry, anxious to move its laboratories as far from Paris as possible, chose Toulouse as the site for operations, the school suited its need perfectly. The school was requisitioned, the Ministry took possession, installed its services and housed its staff in the hostel. The situation was, of course, only to be temporary, lasting for the duration of hostilities, but unfortunately, on the repeated pressing requests of the Air Ministry which saw only too well the advantages offered by such an institution situated at Toulouse, an important centre of flying and of aeroplane construction, it has now become permanent. The Ministry of Agriculture has had to yield to the occupier.

Thus the project dear to M. Leclainche of endowing Toulouse with a veterinary school worthy of taking its place amongst the largest and finest veterinary institutions in the world, failed chiefly because of delays and the circumstances due to the war, which have been briefly mentioned. None the less the project is a measure of the skill and energy of the Director of Veterinary Services whose deep knowledge of all the necessary scholastic and professional



Professor Emmanuel Leclainche

problems involved and whose unique position at the Ministry of Agriculture enabled him to plan the work and to proceed with it to the point where it had so disappointingly to be stopped.

The age of retirement arrived in 1930, and M. Leclainche left the Ministry whilst still remaining a member of the "Consultative Committee on Epizootic Diseases" of which he had been the main spirit for nearly 20 years, and which he will continue to illuminate and enliven with his counsels and apposite interventions. He still holds the position of vice-president to which he was elected.

The Directorship of the "Office," in which he also continued after his retirement, gave this unwearying man the chance to carry out a project that had been very dear to him for years, namely, the writing of a "History of Veterinary Medicine," for which he had collected a vast amount of material. This magnificent and important work appeared in 1936. One may say that it was the first time that professional circles throughout the world were offered a complete, general history, an octavo volume of 812 pages, in which all the features of our art were recorded from its most ancient origin to the inception by Cl. Bourgelat of veterinary instruction (1763) and so down to modern times.

In the preparation of this masterly work, one of analysis and, at the same time, one of synthesis, the eminent master transformed himself into a true historian knowing how to choose amongst a wealth of material and to interpret calmly and without bias what he had chosen. Faultless in form, this book in which the author's great talents as a writer, his high ideals, his clarity and power of thought and the vigour and personality of his style are demonstrated, is an imperishable monument to the honour of veterinary medicine of all countries. In one way it is the crowning of an edifice solidly built by a well-balanced man, highly trained not only in medical science which he cultivated with rare success, but also in the arts of writing, history and philosophy.

Member of the Académie des Sciences from 1917 he was elected president in 1935 inaugurating his presidency by a remarkable dissertation on "*Race et le Racisme*," a subject of great contemporary importance. The sobriety of his eloquence and the perfection of his language, together with the depth of his thoughts on well-established scientific matters, made his speech a little masterpiece equal to the best of those given by his academical colleagues on similar occasions. M. Leclainche is in the Rural Economy section of the Institute, a worthy successor to two great veterinarians, Jean-Baptiste Chauveau, his immediate predecessor, and competitor of Cl. Bernard, and Henri Bouley, the ardent disciple of Pasteur, who had held the position previously.

M. Leclainche is a member of numerous academies, colleges and societies both in France and in other countries. He has been sent to or invited to read papers at many International Veterinary Congresses. His reports and papers on a variety of subjects concerning contagious diseases, their medical and sanitary prevention, and on veterinary education and its adaptation to our own times have always been of the greatest interest and advantage has often been taken of his views to promote reforms. In 1938 at the Congress in Zurich he was awarded the International Congress gold medal. He has received various

XUM

other honours. He is a Grand Officer de la Légion d'Honneur, and has many foreign decorations.

So has passed the life of a great teacher, scientist, administrator and professional man; a man remarkably well-balance and endowed with great physical and mental strength; a master, whose culture, whose original and always intriguing ideas on the many questions with which he had to deal combined with great practical common sense, made teaching and work most interesting; a master finally who, thanks to an uninterrupted career of nearly two-thirds of a century has completed a great work to which men who know of it, members of the veterinary profession without distinction as to their origin, in particular, are happy to pay homage and to show their sincere admiration and great gratitude.

In recognition of the great services that he has rendered, Professor Leclainche was elected on May 18, 1949, Honorary Director of the Office International des Epizooties.

GENERAL ARTICLES

THE TUBERCULIN TEST AND REACTION IN THE HORSE

By J. R. M. INNES* AND J. H. WILKINS†

Introduction

THE claims (or lack of them) made in textbooks regarding the tuberculin test in the horse are in general vague terms and in fact can hardly have been based on actual experience (c.f. Hutrya and Marek, 1946). Three separate surveys carried out in Denmark, Finland and Sweden emphasise this very clearly; a recent experience of ours focused our attention on these papers and has instigated us to write this note, which may accentuate the results of these European workers and which are of importance to practitioners who have any interest in equine practice.

Plum (1945), in Denmark, carried out the tuberculin test on 2,473 horses; autopsies were made on four avian and two bovine reactors; in none were there any signs of active or latent tuberculosis as evinced by macroscopic, microscopic or cultural examinations. He concluded that the test was less reliable than in the case of cattle and that horses might acquire this sensitivity to tuberculin by ingestion, or inhalation, of strains of acid-fast bacilli (pathogenic or non-pathogenic), and that they were resistant to actual infection. Another important finding of Plum's was the co-reaction of many horses to bovine and avian tuberculin; bovine reactors had more avian co-reactors than the reverse. These findings are in harmony with some work carried out in Finland

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by Stenius (1945). Thirty-six horses were tested intradermally with avian and mammalian tuberculin, and also with veal broth similar to that used in the preparation of the tuberculins. Twenty-six reacted to all three reagents, seven reacted to both types of tuberculin but not to the veal broth, two animals had reactions to avian tuberculin and veal broth, and two others reacted to the mammalian tuberculin and veal broth. The reactions appeared to be greatest after 48 hours, but they were still readily seen after 72 hours. No avian or bovine cases of tuberculosis could be found on the farms where these horses originated. Human sources of infection were considered improbable. In a second series of tests, 100 horses were tested with mammalian tuberculin and veal broth. There were no reactions to the broth, but 33 reacted to the tuberculin. A third group, consisting of 101 animals, was tested with tuberculin made from synthetic medium, and of these 24 reacted. The sensitivity to tuberculin was not considered to be due to avian, bovine or human tubercle bacilli, but probably due to sensitisation by other acid-fast bacteria. Magnusson (1944) has made a most valuable contribution, not only to this aspect of tuberculin testing in the horse, but also to pathology. (Reference to the latter will be made in a subsequent article on pathology.) His survey and results can best be expressed by his tabulated results:

Age	No. of horses tested	No. of bovine reactors	No. of avian reactors	No. of reactors to both avian and bovine	No. of only bovine reactors	No. of only avian reactors
Horses under 3 years old	391	11 (2.8%)	29 (7.4%)	6	5	23
Over 3 years	494	90 (18.2%)	248 (50.2%)	78	12	170

He discusses at some length the nature of this sensitivity to the tuberculin test. In one experiment carried out on 64 horses, nine showed a reaction to bovine and 26 to avian, but a retest, made two years later, showed seven of the former and eight of the latter had lost allergic response; the sensitivity thus is not permanent through life. The table also shows clearly that this sensitivity is acquired and increases with age.

The non-specific sensitisation to tuberculin ("no visible lesion reactor") in cattle was recognised as soon as tuberculin testing was begun and has occupied the attention of many investigators in this country and elsewhere. This problem is discussed briefly, but succinctly, by Francis (1947), who mentions that there are at least four causes: infection by *Myco. johnei*, the human or avian types, and the presence of the so-called "skin lesion" containing acid-fast bacilli which have not yet been isolated, and the observations of Buxton and Glover that *Br. abortus* infection experimentally might produce the same sensitivity. This problem is discussed by Magnusson, and he also raises the unlikely possibility that other non-specific, and unassociated, diseases such as parasitic thrombus and aneurysm might play a part. There is, however, no real conclusion which can be made. It would, however, be important and of interest if a similar survey was made in this country. The question can be raised whether the test is worth doing at all if no reliance can be placed on the results; the life of a

XUM

valuable horse might depend on what diagnostic value is attached to a positive reaction in the absence of other clinical data.

Protocols

(a) *Example of positive avian test concomitant with the presence of tuberculosis.*

CASE P.M. No. 69.46.—Heavy cart horse, eight years, G.; vague history for 8-9 months of gradual loss of weight, ill-health and unfitness for work; stated always to be non-febrile; appetite moderate; pain in swallowing, with stiffness of neck and disinclination to move; no enlargement of superficial lymph nodes. Tuberculin test made, using Weybridge bovine and avian PPD tuberculin (single intradermal), with subsequent marked reaction to avian with maximum swelling about 72 hours; autopsy one week later.

SUMMARY OF PATHOLOGICAL FINDINGS.—No lesions in any part of mouth, pharynx, tonsils or retropharyngeal lymph nodes; massive fibrous, non-caseous, enlargement of mesenteric, bronchial and splenic lymph nodes; numerous minute nodular lesions mainly subpleural, caudal lobes lungs both sides; small bronchopneumonic focus (tuberculous), ventral border of each caudal lobe; no enlargement of spleen but three pale, fibrous, almost tendinous, nodules about 2 cm. in diameter in substance—only slightly gritty; numerous minute 1 mm. white subcapsular spots in liver, but no other changes; no lesions hepatic lymph nodes; macerated specimen of cervical vertebræ showed no tuberculous caries, but marked coralliform spicular hypertrophic periosteitis of bodies and transverse processes with some narrowing of foramina; non-specific 2 cmm. ulcerated erosion of œsophageal part of stomach. Sections were made of all lesions seen; those in various parts of the lungs, lymph nodes and spleen were tuberculous in nature as seen in the horse and about which more comment is made in a later article;—almost complete absence of caseation and calcification, marked fibrous and proliferative type of inflammatory response with follicular type of epithelioid cell infiltration and many large multinucleated giant cells of the Langhans type. Some of the minute subcapsular lesions in the liver were tuberculous, others were small areas of fibrosis—old-standing parasitic lesions? Acid-fast bacilli were relatively scanty in all lesions.

A strain of the organism was recovered by Mr. J. Francis, B.Sc., M.R.C.V.S., Vet. Res. Labs., I.C.I., Wilmslow, who reported that it was of the bovine type.

(b) *Example of positive avian test with absence of tuberculosis.*

CASE P.M. No. 51.48.—Thoroughbred, eight years, G.; clinical history irrelevant over previous two years except that the horse had suffered from some obscure (?) pulmonary complaint which was in fact chronic bronchitis and broken wind, and which had resulted in the animal being unable to be galloped regularly at racing pace and be trained; it had almost certainly been kept on a farm during the war. A single intradermal test was made using control broth, avian and bovine PPD, one injection above the other; a very slight swelling occurred on the bovine site within a few hours, which disappeared within 10 hours; there was a slight reaction in the avian site at 48 hours, but

FIG. 1

Horse. Case P.M. No. 51.48. Appearance of sites of injection of control fluid, avian and bovine tuberculin from above to below three days after injection. Thick corded lymphatics extend to prescapular lymph node. In some ways the photo is misleading as the swellings appear to involve each site; that of the control fluid could not be detected within 24 hours, the bovine rapidly disappeared while the flot painful avian site appeared later and spread far beyond all three sites.

extremely marked about 72 hours (diameters about 22 cm. x 20, skin thickness 14 mm. compared with 2 mm. control fluid); thick-corded lymphatics extended from the lesion to the prescapular lymph node. (Fig. 1.)

SUMMARY OF PATHOLOGICAL FINDINGS.—Marked pulmonary emphysema apical lobes both sides; diffuse patchy emphysema all other parts of lungs; chronic bronchitis all lobes; occasional areas of fibrous pleural thickenings; one subpleural fibrous scar dorsal margin left caudal lobe lung almost in contact with a fused rib exostoses (old-standing oblique and transverse fractures of 8th and 9th, respectively—confirmed by X-ray); chronic fibrous perihepatitis diaphragmatic surface liver; persistent thymus; normal cardiovascular system and kidneys; normal spleen apart from occasional perisplenic fibrous tags; no lesions in any lymph nodes—superficial, pharyngeal, mesenteric, gastric, bronchial, mediastinal, etc. All organs were examined histologically, a number of sections being taken from each organ and the above diagnosis, suspected anatomically, confirmed and without a trace of a tuberculous lesion being found. Smears from all organs and all sections stained by Ziehl-Neelsen were negative for acid-fast bacilli; no cultural or guinea-pig work was therefore done. Smears from organs and nasal discharge were also examined by Ziehl-Neelsen stain and by fluorescent microscopy with negative results.

Comment

In view of the work of Plum, Stenius and Magnusson, this experience of ours exemplifies the unreliability of the clinical diagnostic value of the tuberculin test in horses. It also emphasises another point brought out by these workers, viz. that an avian reaction may be evinced alone or simultaneous with a bovine one in the presence or absence of tuberculosis. In the first case we assume that the avian reaction was an allergic response to the presence of active disease, evident macroscopically, histologically and by isolation of the bovine type of organism. In the second case the reaction was even more marked than in the first (Fig. 1); the autopsy was carried out with meticulous care and no lesion was found which could possibly have been tuberculous in nature. (The findings were, however, in harmony with the clinical picture of old-standing chronic bronchitis and emphysema and the record is given in detail as an indication of these points.) The problem why horses should show such sensitivity is of importance and one to be solved. It has an interest for the practitioner from the point of view of clinical diagnosis who might be faced with making a decision regarding slaughter of a valuable horse on the basis of a positive reaction, perhaps with some personal embarrassment subsequent to the autopsy.

Magnusson draws attention to the intricacies of a diagnosis of TB on clinical signs and symptoms in the horse; in the few autopsy cases (five) seen by us (J.R.M.I.) it is frankly stated that it would have been perplexing to understand why any clinician would have suspected the disease in the first place. Apart from general systemic "toxæmia" (if this does occur) and inability to work, it would be puzzling to understand how, for example, isolated large

nodular lesions in lymph nodes and spleen and/or scattered small lesions in the lungs or liver, etc., would give rise to any specific clinical syndrome.

If the test is done it would obviously be wise to inject both avian and bovine PPD tuberculins, but clearly it can only be of clinical value when the reaction is a negative one, because no one yet has shown the presence of a negative result in the presence of active disease.

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THE AGGLUTINATION REACTION OF BOVINE SERUM IN THE DIAGNOSIS OF TRICHOMONIASIS

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Introduction

THE diagnosis of bovine trichomoniasis has presented a serious problem since *Trichomonas fœtus* was recognised as a specific cause of infertility and abortion. Many methods have been investigated, but the direct microscopical observation of the motile trichomonas in discharges collected from the vagina, although unsatisfactory, is still the only means of positive diagnosis.

Previous Work

Witte (1934) was the first to investigate the possibility of using the agglutination by bovine serum of a live suspension of *Trichomonas fœtus* as a serological aid to diagnosis; on detecting the presence of a non-specific agglutinin, however, he concluded that the method was unsuitable. Further observations showed normal agglutinins were weak or absent in the guinea pig, and Witte was able to demonstrate the development of specific agglutinins to *T. fœtus* as a result of the intra-peritoneal injection of live organisms. Non-specific agglutinins have been demonstrated in rabbit serum by Nelson (1937, 1938), Endress (1939), Morisita (1939), Zeetti (1940), Robertson (1941), Schneider (1941), and Byrne (1942), and in normal equine sera by Endress (1939), Robertson (1941) and Schneider (1941). The present author has observed non-specific agglutinins in the sera of the horse, donkey, goat, sheep, man, rabbit, guinea pig and rat. Endress (1939) and Schneider (1941) demonstrated weak agglutinins in chicken serum. Morgan (1944) examined sera from 24 species of vertebrates in the following five classes: Pisces, Reptillia, Amphibia, Aves and Mammalia; all showed non-specific agglutinins to *T. fœtus.*

Robertson (1941), using sera from normal and artificially immunised rabbits, elaborated a technique by which she was able to differentiate the specific agglutination of a live trichomonas suspension from the non-specific agglutination, and

later applied the method to the detection of specific agglutinins in bovine serum. Kerr and Robertson (1941, 1943) considered this method of diagnostic value when applied as a herd test. Morgan (1943), using a modified technique, confirmed the development of specific antibodies in bovine sera, but concluded that the test was of no practical value for diagnosis as there was such a low percentage of infected animals showing a specific reaction.

The following investigation was carried out in order to assess the value of Kerr and Robertson's agglutination technique in the diagnosis of trichomoniasis in Britain.

Materials and Methods

The Blood Agglutination Test

The technique of the blood agglutination test was described by Robertson (1941) and Kerr and Robertson (1941 and 1943). Pierce (1947) gave photomicrographs of the various reactions, and there is no need to repeat the description in the present paper.

The method of cultivation of *T. fœtus* described by Kerr and Robertson in 1943 was also used in the preparation of test suspensions for the present work, although, latterly, Bacto-tryptose broth was substituted for the Douglas heart broth used by the previous authors, as it was found to give more uniformally good results.

The following strains of *T. fœtus* were used in the preparation of live test suspensions:—

(1) *Belfast* strain—isolated by Kerr and Robertson from an outbreak of trichomoniasis in N. Ireland in 1938.

(2) *Manley* strain—isolated by Mahmoud (1944) from an outbreak at Manley, in the county of Cheshire, England.

(3) Strains isolated in Britain by the author during the course of the investigation and described in the text. (See table III and Map 1).

The Selection of Herds for Serum Sampling

The criterion of infection in a herd was the microscopical demonstration of motile parasites in one or more vaginal discharges, or in the preputial washings of the associated bull. It is not possible to rely on a negative microscopical examination for evidence of the absence of infection, and clean animals were selected from herds in which a breeding record had been well maintained, and where no infertility had appeared over several preceding years.

Experimental Results

Diagnostic tests using the Belfast strain of T. fœtus *as the agglutination suspension*

The reliability of the test for the exclusion of clean animals was confirmed by the examination of 100 samples of sera known to have come from clean herds, and of ten sera from a group of virgin heifers with a high titre through artificial immunisation with *Brucella abortus*. There was no positive agglutination reaction for trichomoniasis, and it was concluded that the chances for the occurrence of false positive reactions was very slight indeed.

●B: BELFAST STR.
●M: MANLEY STR.
NUMBER REF TO TABLE VI
B1
M14
SCOTLAND
CUMBERLAND
DURHAM
WESTMORLAND
NORTH RIDING
YORK
EAST RIDING
WEST RIDING
LINDSEY
B24
M6
B5
B25
22M
M21
B26
B27
12B
23M
M7
M18
B13
NORFOLK
B2&4
B3
SUFFOLK WEST
SUFFOLK EAST
WARWICK
B20
B10
HEREFORD
CARMARTHEN
GLOUCESTER
GLAMORGAN
MONMOUTH
B16
WILTS
SURREY
KENT
B15
HANTS
B23
SUSSEX WEST
SUSSEX EAST
DEVON
DORSET
CORNWALL
MAP SHOWING THE LOCATIONS OF TRICHOMONAS OUTBREAKS IN TABLE VI
Scale

A third series of tests was carried out on samples of sera from 217 animals in herds in which trichomoniasis had been definitely diagnosed, and in which the history of the outbreak and the clinical symptoms shown by the animals suggested a high incidence of the disease.

The results obtained in the application of the agglutination tests on these 217 sera, using the Belfast strain of *T. fœtus* was as follows: 13 positive, 6 above normal, 18 slightly above normal, and 180 negative.

Duplicate diagnostic tests using Manley and Belfast strains of T. fœtus *as agglutination suspensions*

On account of the antigenic specificity of the two strains, *Manley* and *Belfast,* as was first shown by Kerr and Robertson in 1945, it seemed reasonable to suppose that there would be an increase in the number of positive sera detected if the correct antigenic strain of *T. fœtus* was used in the agglutination suspension.

A further series of tests was, therefore, carried out, in duplicate, on 179 samples of serum from infected herds using both the *Manley* and the *Belfast* strains, and occasionally using a culture of organisms isolated from the actual outbreak of trichomoniasis that was under observation.

The results obtained using both strains of *T. fœtus* on 179 samples of serum from infected herds was as follows: 15 positive, 8 above normal, 17 slightly above normal, and 139 negative.

The following table gives a summary of these results and an analysis of the results obtained with the individual *Belfast* and the *Manley* strains.

Table No. 1. Showing the results of the agglutination test on 396 serum samples from herds infected with trichomoniasis.

Strain of *T. fœtus* used in the agglutination suspension		Total No. of sera tested	Positive	Above normal	Slightly above normal	Negative
Belfast		217	13	6	18	180
*Duplicate tests with the *Manley* and the *Belfast* strains.	*Belfast*	98	13	4	14	67
	Manley ...	81	2	4	3	72
	Total reactions .	179	15	8	17	139

*Only the results of the strain which showed the best response are recorded here.

Distribution of the two antigenic types of T. fœtus *in Britain.*

The antigenic type in these experiments was determined either by obtaining a positive serum from the field and testing it against *Manley* and *Belfast* strains or by isolating and culturing the strain concerned in the outbreak and typing it in agglutination tests against positive *Manley* and *Belfast* sera. The data obtained in carrying out such tests with the appropriate controls is recorded in Table 2, where two newly-isolated strains from field outbreaks, Derbyshire (B.7) and "710" (M.19) are shown to resemble *Manley* or *Belfast* antigenic types. In this particular test artificially immunised rabbit sera were used. The results show how little overlapping of antibody occurs between *Manley* and *Belfast* strains.

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Table No. 2, showing the results of an agglutination test using artificially immunised rabbit sera to determine the antigenic type of two recently isolated strains of *T. fœtus*—" Derbyshire " and " 710."

Antigen	Serum	Serum dilutions				Index
		1/6	1/12	1/24	1/48	
Manley	Normal	+ (+)	+	(+)	(+)	
Manley	Manley	+++++	++++ (+)	++++ (+)	++++	$\frac{18}{3\frac{1}{2}}$
Manley	Belfast	++ (+)	++	+ (+)	+	$\frac{7}{3\frac{1}{2}}$
Belfast	Normal	+ (+)	+	(+)	(+)	
Belfast	Manley	++ (+)	++	+ (+)	(+)	$\frac{6\frac{1}{2}}{3\frac{1}{2}}$
Belfast	Belfast	+++++	+++++	+++++	+++++	$\frac{20}{3\frac{1}{2}}$
Derbyshire	Normal	+ (+)	+ (+)	+	(+)	
Derbyshire	Manley	++	++	+ (+)	(+)	$\frac{6}{4\frac{1}{2}}$
Derbyshire	Belfast	++++	++++	+++ (+)	+++ (+)	$\frac{15}{4\frac{1}{2}}$
710	Normal	+++	++	+	(+)	
710	Manley	+++++	+++++	++++	++++	$\frac{18}{6\frac{1}{2}}$
710	Belfast	++ (+)	++	+	(+)	$\frac{6}{6\frac{1}{2}}$
Manley	Saline	—	} Controls			
Belfast	Saline	—				
Derbyshire	Saline	—				
710	Saline	—				

These results give a clear indication of the importance of using the homologous strain of *T. fœtus* in carrying out the test, otherwise, there is an obvious danger of the failure to detect positive sera. A further investigation was necessary to determine, firstly, whether the *Manley* and *Belfast* strains represented antigenic extremes between which other strains might lie; secondly, to see whether any of these new strains represent a third antigenic type; and, thirdly, to obtain some estimate of the distribution of the *Manley* and *Belfast* antigenic types in Britain.

Table 3 records the identification of fifteen strains isolated by the author, from different outbreaks, and a further two strains isolated by Dr. Robertson. The strains involved in nine further outbreaks were also identified by typing the positive sera from affected animals, four carried out by the author and five by Dr. Robertson.

The results show that both *Manley* and *Belfast* antigenic strains are widespread in this country, that all the strains isolated and the positive sera typed can be associated with the *Manley* or *Belfast* antigenic types, and that in the

limited number of strains isolated and the positive sera typed, no third antigenic variety was detected.

Table 3, showing the distribution of the two antigenic varieties of *T. fœtus, Manley* and *Belfast*. Determined by typing new strains or identifying positive field sera (see also Map 1).

County, with name of strains or town from which sera or culture derived.		Antigenic Association		Map Reference Numbers
Strain	Sera	Manley (M)	Belfast (B)	
Angus (Forfar)		+		1
Cambridgeshire (Dora Strain)*			+	2
	Cambridgeshire (Haverhill)‡		+	3
Cambridgeshire (Nixon strain)*		+		4
	Cheshire (Baddington)‡		+	25
	Cheshire (Church Minshull)		+	5
Cheshire† (Manley)		+		6
Denbighshire (Ruthin—2 strains)			+	24
Derbyshire (Belper)			+	7
Derbyshire (Kniverton)			+	8
	Derbyshire (Woolley Stretton)‡		+	9
	Hertfordshire (Much Hadham)‡		+	10
Oxfordshire (Oxford)			+	11
Shropshire (Cockshutt)			+	12
	Shropshire (Shifnal)		+	13
	Skye (Earlish)		+	14
Somerset (Preston)			+	15
Somerset (Wanstrow)			+	16
	Staffordshire (Baddenhall)	+		17
Staffordshire (Hanbury)		+		18
Staffordshire (Penkridge "710" strain)		+		19
Staffordshire (716) (Penkridge)		+		20
Staffordshire (Rickerscote)		+		21
Staffordshire (Tilstock "25" strain)		+		22
	Sussex (Pyecombe)‡		+	23

* Isolated and identified by Dr. M. Robertson.
† Isolated by Mahmoud (1944), identified by Kerrand and Robertson (1945).
‡ Identified by Dr. Robertson.

Discussion

The comparison of experimental results with those of other workers

Initially all the tests were carried out using a suspension prepared from the *Belfast* strain which had been isolated in N. Ireland. Results in herds where

trichomoniasis had been previously diagnosed by the direct microscopical observation of motile trichomonads were disappointing and compared unfavourably with those of Kerr and Robertson (1941). These authors, using the *Belfast* strain of *T. fœtus* in the test suspension, detected 25 positive reactors by the blood agglutination test on 120 sera from animals " in infertile herds." Thirteen of the reactors, however, were derived from 25 animals selected on a history of abortion or sterility. These, in the author's experience, would be animals which had suffered from severe infection, and may account for the greater proportion of reactors detected.

However, in view of the constant level of non-specific agglutinins detected in the normal sera tested, it seems probable that the majority of " above normal " reactions detected in tests on sera from infected herds in these experiments were significant. Where reasonably reliable histories were obtained, the majority of the reactors detected in our experiments were derived from animals in which an œstrus associated with chronic discharge or closed pyometra had followed the infective service.

It seems likely that a selection of animals of this kind in which the focus of infection had probably been extensive would result in the detection of a larger proportion of positive reactions.

The significance of the isolation of the Manley strain of T. fœtus.

Kerr and Robertson's demonstration of the antigenically distinct *Manley* strain offers a further explanation for our lower percentage of reactors. The indications are that the *Manley* strain may be widely distributed in England, while it has not been isolated from Northern Ireland (Kerr and Robertson, 1948), where Kerr and Robertson's tests were carried out, with the homologous *Belfast* strain.

Morgan's results (1944) from the application of the agglutination test were even less favourable than those here reported, and it is not unlikely that the use of a heterologous antigen was also responsible in that series of observations.

The significance of the number of reactors detected in Belfast type of infections compared with the Manley type.

Owing to the many variables which may be associated with outbreaks in different herds and in different breeds, including the varying husbandry and nutrition, virulence, duration of infection, and acquired immunity, the significance in the relationship between the numbers of reactors to *Manley* and to *Belfast* strains recorded is questionable.

To identify which factors might be significant would involve a very large number of tests, and other experiments outside the scope of the present work. However, if the strain factor is significant, the *Manley* variety may be of lower virulence, may be less antigenic, or may not initiate such a high percentage of clinical states likely to produce a positive blood titre, although still quite capable of causing severe breeding troubles. The significant point in the present discussion, however, is that only a very limited number of positive reactors can be

expected in outbreaks of trichomoniasis, particularly when the outbreak is identified with *Manley* type strains.

Summary

1. Sera from animals in herds with normal breeding records or from animals suffering from brucellosis, even when showing a titre to *Br. abortus,* do not produce reactions to the trichomonas agglutination test.
2. Specific agglutinins to *Trichomonas fœtus* were detected in a limited number of sera samples from herds known to be infected with trichomoniasis. The method of assessing the results enabled a clear distinction to be made between normal and positive sera. Indeterminate reactions were encountered, however, which were above the normal non-specific level and below the positive level. In view of the constant level of the 100 normal samples, many of these reactions probably signified infection.
3. A considerable difference in the percentage of positive reactions in *Belfast* and in *Manley* outbreaks was noted, 13 per cent in the former and only 2 per cent in the latter. The significance of these figures is discussed.
4. Although the test should be regarded as a herd test, some selection of animals most likely to react seems indicated. All animals suffering from a clinical manifestation of trichomoniasis producing a good focus of antigen production, such as an open or closed pyometra, or having aborted as a result of infection, should be selected.
5. In Britain (England, Scotland and Wales) as distinct from Northern Ireland, the *Manley* strain appears to be widespread.
6. It is necessary to carry out all diagnostic tests in duplicate using *Manley* and *Belfast* strains.
7. The isolation and typing of 17 strains of *T. fœtus* and the typing of nine other strains from positive field sera indicates that all strains so far isolated are antigenically similar to either *Manley* or *Belfast* strains of *T. fœtus,* and that these two types do not represent antigenic extremes between which the other strains isolated fell.

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I am grateful to Dr. E. L. Taylor and Dr. M. Robertson, F.R.S., for their help and encouragement in the work and assistance in the preparation of this paper for publication.

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A REPORT ON THE USE OF STAINLESS STEEL INTRAMEDULLARY PINS AND SHERMAN-TYPE VITALLIUM BONE PLATES IN THE TREATMENT OF SMALL ANIMAL FRACTURES

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THE closed reduction and external fixation of many bone fractures in small animals is by no means satisfactory on account of difficulties, not only in applying adequate traction and manipulation to align the fracture fragments, but subsequently to maintain sufficient extension and support to counteract muscular spasm and recurrence of displacement. A sound method of internal fixation has therefore long been desirable and with this in mind the writer, over a number of years, has used various materials including silver wire sutures, carbon steel plates and screws of the Arbuthnot Lane type, plastic pegs and autogenous bone grafts. Results in general, however, have been unsatisfactory for a variety of reasons, in which must be included septic infection and faulty techniques.

More recently, by kindness of Mrs. Helen Robertson, M.R.C.V.S., of Los Angeles, the use of the Kirschner Ehmer modification of the Stader splint was made possible in a series of twelve cases of diaphyseal fracture, but results were not consistently favourable — again probably due to insufficiently good technique. From this series of operations, however, the inert nature of stainless steel in the tissues was very practically demonstrated and, as a direct result, the open reduction and intramedullary pinning of certain classes of bone fracture was started.

Since the beginning of 1948 thirty-seven cases have been treated by this means in the dog and cat with a high percentage of satisfactory results, but there seems little doubt that the success of the treatment in these cases has been due, not only to the non-electrolytic nature of stainless steel, but to efficient bacteriostasis. In every operation penicillin was used parenterally, both pre-operatively and post-operatively. During the operations a mixture of penicillin calcium salt and sulphathiazole (5,000 units in 1 gram) was insufflated occasionally into the open reduction wounds.

The cases treated by intramedullary pinning are summarised as follows:—

	Cat	Dog	Total
Tibia	1	4	5
Femur—			
Diaphyseal	4	12	16
Supracondylar	3	7	10
Humerus	—	1	1
Radius	—	1	1
Mandible	—	4	4
	8	29	37

The results of the foregoing cases are summarised as follows:—

Failures due to faulty technique	4
Failure due to sepsis	1
Limited success due to mal-union*	1
Cases not presented for re-inspection	3
Known satisfactory results with good function	24
Current cases expected to make satisfactory recovery	4
	37

Preparation of the Intramedullary Pin

The rod used has been of three diameters, namely 3/32 in., 1/8 in. and 5/32 in. approximately, and is described as "Bright drawn ground and polished 18/8 austenitic type stainless steel." The tensile strength varied approximately from 65 to 100 tons per square inch.

The length of pin required for pinning a long bone can only be determined satisfactorily by measurement of the bone from an X-ray film. It is advisable to radiograph both the fractured limb and its opposite in lateral positions and estimate the length of pin required from the shadow of the normal bone. An X-ray film of the fractured limb in two planes is necessary to assess the extent of the fracture, its suitability for pinning and prognosis. Pin lengths recommended for the femur, tibia and humerus are:—

Femur.—From the upper extremity of the great trochanter to a point on a line which would bisect the distal condyles laterally.

* Mal-union supracondylar femoral fracture operated on two months after original injury.

Tibia.—From the upper extremity of the intercondylar spines to within about 0.5 cm.* of the compact bone between the distal malleoli.

Humerus.—From the upper extremity of the lateral tuberosity to a point on a level with the upper limit of the coronoid fossa.

(See Illustration No. 4.)

One end of the pin is sharpened to a point of three or four facets by filing or grinding on an emery wheel. The length of the facets should be about 1.25 to 1.5 × the diameter of the pin. A shorter point, particularly with the heavier grades of rod, may result in difficult insertion. It is desirable that the polished surface of stainless steel pins should be abraded as little as possible during their preparation. Having measured from the radiograph the length of pin required, a method found satisfactory is to make a fine circumferential hacksaw cut into the pin at the measured distance. The cut will be the breaking point of the pin after its insertion to the estimated length; thus the cut must be deep enough to permit breaking, e.g., 1.5 mm. (depending on the diameter of the rod), but not enough to allow its fracture during the strain of inserting by boring.

To ensure the pin being held fast in the holder during insertion and to facilitate withdrawal, a segmental "flat," or two opposed "flats," may be filed to extend about 1.5 cm. on each side of the "breaking point."

The pin is cut off at about 3 or 4 cm. beyond the "breaking point" to allow sufficient length for stable fixation in the pin holder.

(See Illustration No. 1.)

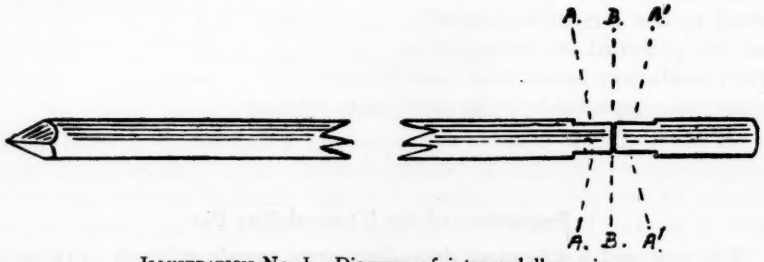

ILLUSTRATION No. I. Diagram of intramedullary pin.

A. Opposed segmental "flats" to facilitate pin withdrawal.

A. Opposed segmental "flats" which can, if necessary, be used to engage grub screws during insertion of pin.

B. Predetermined "breaking point" made by circumferential fine hack saw cut to a depth of about 1.5 mm.

The Pin Holder

This is simply a sterilisable all-metal (preferably stainless steel) handle by which one end of the pin may be held securely during its insertion and sometimes withdrawal. The pin and handle thus comprise an awl. The pin can be retained by means of opposing recessed grub-screws adapted for turning by an Allen key, or by the drill chuck type of grip. The latter may prove more useful in pin withdrawal.

* This distance is suggested as suitable for the average sized terrier and can be varied according to the size of the animal.

PLATE I

ILLUSTRATION No. 2
All - metal intramedullary pin holder with opposed recessed grub screws for tightening with an Allen key.

ILLUSTRATION No. 3
All - metal intramedullary pin holder being a modification of Max-Page's chuck.

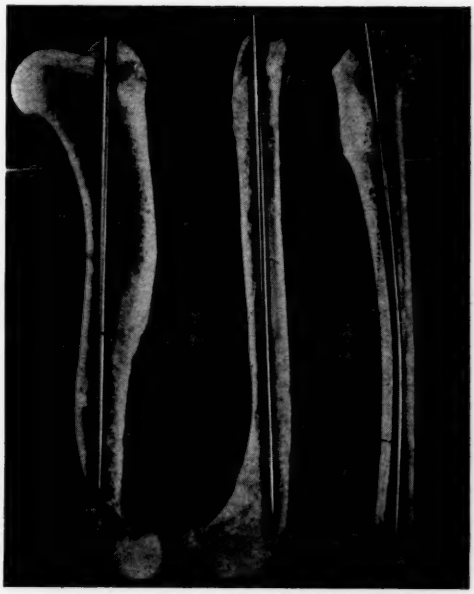

ILLUSTRATION No. 4
Longitudinal sections of humerus, femur and tibia of an adult dog with intramedullary pins *in situ*. Note curvature of the tibial pin.

(*Article by Knight*)

ILLUSTRATION No. 5
Cat, castrated male, 6 years old. Twenty-four hours old comminuted fracture of the femur.

ILLUSTRATION No. 5A
Immediately after open reduction and intramedullary pinning.

ILLUSTRATION No. 5B
Nine months after operation. Intramedullary pin still *in situ*. Limb function entirely normal.

ILLUSTRATION No. 6
Mongrel bitch, four years old. A two hours old transverse fracture of the femur.

(Article by Knight)

ILLUSTRATION No. 6A
Immediately after open reduction and intramedullary pinning.

ILLUSTRATION No. 6B
Twenty-one days after operation.

ILLUSTRATION No. 6C
Thirty-five days after operation. Limb function good with slight lameness only.

ILLUSTRATION No. 6D
Forty-nine days after operation and five days after removal of intramedullary pin. Limb function normal.

(Article by Knight)

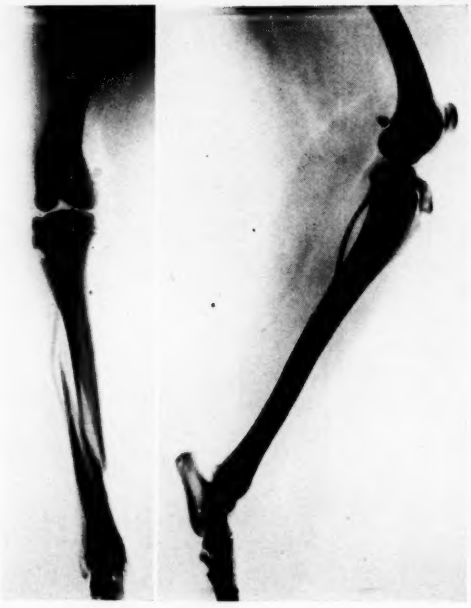

ILLUSTRATION No. 7
Mongrel dog, five months old. Recent oblique and comminuted fracture of the tibia.

ILLUSTRATION No. 7A
Immediately after open reduction and intramedullary pinning.

ILLUSTRATION No. 7B
Twenty-four days after operation and immediately before removal of intramedullary pin. Limb function good.

ILLUSTRATION No. 8
Greyhound dog, two years old. Ten days old fracture of the radius and ulna.

(Article by Knight)

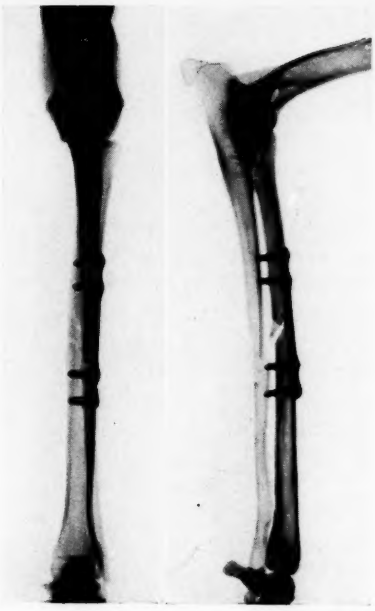

ILLUSTRATION No. 8A
Immediately after open reduction and internal fixation of the radius with a Sherman type Vitallium plate.

ILLUSTRATION No. 8B
Twenty-one days after operation. Limb in use.

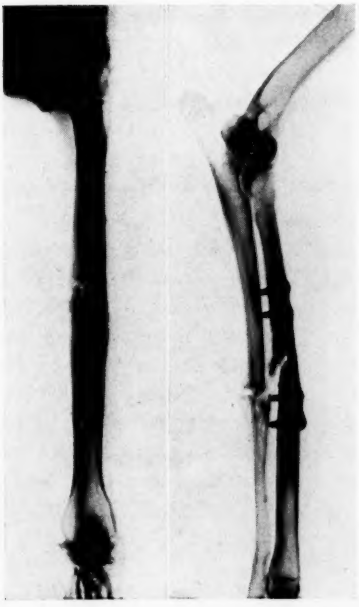

ILLUSTRATION No. 8C
Forty-seven days after operation. Limb function good with slight lameness.

ILLUSTRATION No. 8D
Seventy-two days after operation and immediately before removal of plate. Very slight lameness only.

(*Article by Knight*)

ILLUSTRATION No. 9
Alsatian bitch, five months old. Three days old fracture of the radius and ulna.

ILLUSTRATION No. 9A
Immediately after open reduction and internal fixation of the radius with a Sherman type Vitallium plate.

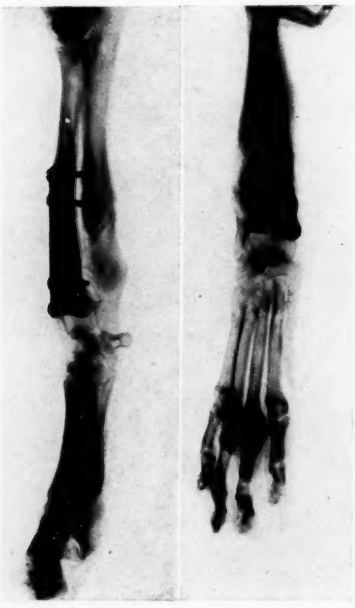

ILLUSTRATION No. 9B
Twenty-two days after operation. Good function.

ILLUSTRATION No. 9C
Twenty-seven days after operation and immediately after removal of plate.

(Article by Knight)

The holder is all that is necessary for actual pin insertion by boring through the compact and cancellous bone and along the medullary cavity. The handle also provides a power arm for leverage to snap the pin at the "breaking point." (See Illustrations Nos. 2 and 3.)

Preparation for the Operation of Open Reduction and Intramedullary Pinning

Whenever possible to employ, penicillin pre-operatively is an advantage and it is recommended that an intramuscular dose of 3,000 units per lb. body weight should be given to the animal at 24, 16, 8 hours and immediately before operation. In most cases this should be practicable as intramedullary pinning is not ordinarily an emergency procedure. If the serial injections are not possible, at least an immediately pre-operative one should be given.

General anæsthesia is necessary, although when possible and preferred no doubt a spinal anæsthetic could be used. The fractured limb needs extensive and thorough clipping and/or shaving, followed by the ordinary routine preparation of the skin before a surgical operation. A hobble made from soft webbing or similar material must be looped securely around the lower part of the limb in order that an assistant can apply traction when required during the operation. This hobble should be sufficiently long to ensure the assistant's position being well away from the operating table when traction needs to be applied.

When the animal is on the operating table the limb must be fixed to counter this traction by a loop of soft webbing running in the axilla or groin to some fixed point on the table. Before the operation begins it is as well to ensure that this fixation of the limb is adequate and with material strong enough for the purpose. Breaking or slipping of the traction hobbles under strain during the operation is a mishap well worth while preventing. It is an advantage to have the table immobilised firmly to prevent its moving when the limb traction is applied.

Technique for Open Reduction and Intramedullary Pinning of a Femoral Shaft Fracture

The anæsthetised animal prepared as described is placed upon the operating table in a lateral position with the fractured limb uppermost. Apart from the operation site, which is the lateral aspect of the thigh from about the stifle to a point allowing easy access to the trochanteric fossa, the animal's body and the table should be covered with sterile towels. The medial aspect of the fractured limb and the opposite limb also must be well covered with sterile towels in order to permit free manipulation and palpation medially during operation without risk of breakdown in sterility.

In the relaxed anæsthetised animal the fracture will probably be palpated without difficulty. The skin incision should be made sufficiently long to give a wide exposure of the fracture site and, in an average sized terrier for example, this incision will probably need to be at least 10 to 12 cm. in length. Hæmorrhage is dealt with immediately according to its extent by ligation, torsion or diathermy coagulation, and must have been controlled before deepening the

incision to separate the biceps femoris from the lateral vastus muscle. The deep incision is made through the tensor fascia lata roughly parallel to and adjoining the anterior border of the biceps femoris. Hæmorrhage in this field may well be less than from the skin incision and by blunt dissection the belly of the vastus lateralis is very easily freed, retracted anteriorly and the fracture site exposed. The sciatic nerve, its main branches and the larger femoral blood vessels will be situated posteriorly to the incision, and with normal care undamaged by the approach.

At this stage particularly, the advantage of adequate tissue retraction and illumination of the fracture site is stressed. Blunt dissection with a swab around the closed ends of a pair of dressing forceps is useful in finally exposing the fracture fragments. This step will present little difficulty in recent fractures but will become increasingly difficult with age and displacement of the fracture. Having exposed the fractured bone ends an assistant can then apply traction to the foot hobble. This traction is maintained and co-ordinated by the surgeon's manipulation of the fracture until displacement is reduced and the fragments aligned. At this stage the operation site should be lightly insufflated with a bacteriostatic (e.g., penicillin in sterile sulphathiazole) and packed with a swab.

The next step is to make an incision through the skin immediately over the great trochanter and fossa long enough to admit a finger-tip for palpation of the subcutaneous tissues. Preparation for the insertion of the pin is made by returning to the fracture site, enclosing the extremity of the proximal fragment in a swab and raising it to about the level of the skin incision.

The fragment can then be held in suitable bone forceps by an assistant while the pin, firmly fixed in the holder, is directed through the soft tissues to the trochanteric fossa in the same plane as the long axis of the medullary cavity. The compact bone forming the floor of the trochanteric fossa is contacted and, keeping the proximal fragment steady and its extremity in view, the pin is started on its journey by boring through the compact bone into the cancellous bone and so along the medullary cavity. (This procedure will be facilitated if, before carrying it out for the first time, the anatomy of the part is revised, or, better, the operation carried out on a cadaver.) A precaution against accidental and deep penetration of soft tissues by the pin slipping off the compact bone at the start of the boring is to have only a short length of pin protruding from the pin handle. When the medullary cavity has been entered the full length of pin can be exposed. Pin insertion is halted when the point is just visible at the fracture site and at this stage the assistant again applies traction until the fragments are finally re-aligned.

An alternative direction for pin insertion, to overcome any difficulty in locating the floor of the trochanteric fossa and subsequently finding the medullary cavity, requires the anticipation of such difficulty by sharpening the pin at both ends at the time of its preparation. The pin so prepared can be passed into the medullary cavity via its distal extremity. The probability is that the pin so inserted will emerge at the trochanteric fossa. The pin holder can then be

detached and fixed to the other end for completion of insertion into the distal fragment.

If possible at this stage suitable bone forceps should be clamped over the fracture fragments to maintain their apposition. Before driving the pin into the medullary cavity of the distal fragment a final check must be made on fracture alignment and on the position of the limb as a whole. This precaution is necessary against fixation of the distal fragment rotated out of correct position in relation to the proximal fragment. When alignment is satisfactory the pin is driven onwards into the distal fragment until the " breaking-point," which should still be adjoining the extremity of the pin holder, reaches the level of the upper border of the trochanter. By angling the pin handle through 20° or 30° the pin should snap at the " breaking-point," providing the cut has been adequate. Insufflation of both wounds with penicillin and sulphathiazole should then precede occlusion of dead space by suturing with 20-day catgut of suitable thickness. One such suture subcutaneously in the trochanteric wound is usually sufficient. Both skin wounds can then be closed, with nylon for preference, and the incision line protected by a sutured-on pad of gauze.

The technique of burying the pin, as opposed to allowing its protrusion through the skin, is considered to facilitate earlier function of the limb and obviate the risk of infection at the point where the pin emerges.

The technique for pinning the supracondylar or short distal fragment femoral fracture is identical, but clearly demands greater precision. As the short length of the distal fragment necessitates maximum fixation, the diameter of the pin should be as generous as practicable and its point directed well posteriorly into the epiphysis. Over half the femoral fractures treated were in the supracondylar or epiphyseal fracture separation class and the results have been very encouraging.

Slight protrusion of the pin at the junction of the trochlear and intercondylar fossa does not appear to embarrass function, but penetration of the trochlear and protrusion of the pin into the joint space is obviously to be avoided. In cases of suspected over-penetration of a pin the open reduction wound may be closed in the normal manner, but the pin insertion wound plugged and the limb X-rayed. The pin can then be broken after whatever correction of penetration has been necessary and finally the trochanteric wound sutured.

(See Illustrations Nos. 5, 5A, 5B, 6, 6A, 6B, 6C, and 6D.)

Open reduction and intramedullary pinning of the Tibia, Humerus and Mandible

Tibia.—The intramedullary pin may be very conveniently directed to the medullary cavity through the pad of fat immediately posterior to the patella ligament. The extra-osseous portion of the pin, providing it is correctly located and not too long, will cause little or no embarrassment to the function of the stifle joint, the capsule of which has not been opened. The inner aspect of the tibia provides a fairly extensive and easy approach for open reduction. The

bone in the dog has a double curvature and it is recommended that a pin of no greater diameter than $\frac{1}{8}$ in. is used.

(See Illustrations Nos. 7, 7A, and 7B.)

Humerus.—With this bone, unfortunately, experience has been limited to one case of intramedullary pinning. The pin was inserted through the medial aspect of the lateral tuberosity and the approach for open reduction made from the medial aspect of the shaft. The pin was removed after thirty days and normal function restored to the limb.

Mandible.—Four cases of fractured ramus, one of which was complicated by fracture of the superior maxilla, have been treated by stainless steel pinning. The medullary cavity of the mandible may be entered by boring obliquely through the ventral border below the mental foramina. Certain fractures of the ramus posterior to this point may be immobilised by this means, but it is probable that results in general will not be as favourable as in intramedullary pinning of long bones. In three of the cases treated no evidence of damage to the mandibular nerve was evident. In the remaining case the result was believed to be satisfactory but no definite information is available.

Intramedullary Pinning of the Radius.—This bone in both the dog and cat does not provide a favourable point for pin insertion and only in one case was intramedullary fixation attempted. The pin was inserted just above the styloid process and allowed to protrude through the skin which was, as far as possible, protected from pressure by padding. The carpus was strapped in a partially flexed position. After thirty-five days the pin was removed and bone union found to be satisfactory, but pressure necrosis of the carpal skin was extensive. The case was unfortunately lost sight of and no further details became available.

An alternative method of internal fixation of the radius will be referred to subsequently.

Intramedullary Pinning Without Open Reduction.—In certain recent fractures this method may be practicable and two cases are recorded. The recently fractured tibia of a cat was satisfactorily reduced by traction and manipulation only and pin insertion made through the proximal fragment as previously described. A recent femoral shaft fracture in a dog was also satisfactorily aligned by closed reduction and traction to an extent which permitted the introduction of the pin via the trochanteric fossa satisfactorily along the medullary cavity of both fragments. The results in both these cases were satisfactory.

Support of Fracture Site Additional to that Provided by the Intramedullary Pin.—Severe comminution and marked obliquity of a fracture may invite internal support in addition to that provided by an intramedullary pin. A stainless steel wire binding can be applied in one or more loops around the shaft and the ends twisted to provide tension. This procedure is not without objection as there seems no doubt that the pressure of such a binding wire, if sufficient to give useful support, will cause osteolysis. It is probable that the best provision against the slipping of pinned oblique fragments is the use, where possible, of a pin of maximal diameter. The use of an absorbable "spacer washer," ferrule or "distance piece," composed of blood fibrinogen or casein is to be explored.

Supracondylar and epiphyseal separation fractures by reason of one fragment being very short may require some form of external splint to prevent joint flexion pulling the short fragment off the pin. An adhesive bandage without a spint in some cases will provide all restriction to flexion required, but the inclusion of an external spint can be a matter of discretion.

In cases where the disparity in length of the fragments is not marked, experience shows external fixation in addition to intramedullary pinning is usually unnecessary and undesirable. An important advantage of pinning is the comparatively short period between operation and some degree of useful limb function being regained. The benefit of this advantage would undoubtedly be impaired to varying extents by external splinting.

Period during which an Intramedullary Pin may be expected to give useful support.—Experience gained so far from the cases under consideration shows that, in a normally healing diaphyseal fracture in the cat and dog, an intramedullary pin is unlikely to serve much useful purpose after about thirty-six days. On the average pins have been removed at this stage.

In one case a stainless steel pin was removed from the femur of a dog 113 days after insertion. The pin, by comparison with others removed after 30 to 40 days, was found to be quite loose in the medullary cavity and cancellous bone. Extraction proved easy with the aid of a pair of dressing forceps only and the surface of the pin was found to have undergone no evident change.

Tissue Reaction to Stainless Steel Intramedullary Pins.—The only unfavourable tissue reaction to stainless steel pins has been from too great a length of the extra-osseous portion. In two or three such cases where a pin has protruded well above the extremity of the trochanter accumulations of a sterile serous fluid have developed at the hip. Removal of the pin, however, has been followed by complete resolution of the condition, but it is good practice to aim at the prevention of this complication by ensuring that the extra-osseous part of the pin does not protrude unduly.

The Fractured Radius and the Consideration of its Internal Fixation by Methods other than Intramedullary Pinning.—The fractured radius and ulna, in spite of the ease with which these bones may be palpated, manipulated and immobilised by external fixation, often fail singularly by comparison with the femur, tibia and humerus to unite satisfactorily. Furthermore, in the writer's experience, diaphyseal fractures of the radius and ulna are more liable to nonunion and resulting frail limb than any other bones in the dog. Some suitable form of internal fixation can therefore be well employed for the treatment of radial fractures but, as already explained, intramedullary pinning is evidently unsuitable. For this reason some practical alternative was sought and internal fixation by bone plating and screwing on the lines of Arbuthnot Lane suggested itself. The writer had already gained a little experience of the application of this method in dogs, but prior to the plates being available in an inert metal and before the introduction of sulpha compounds. A variety of fracture plates for human surgery in both stainless steel and Vitallium are now obtainable in sizes, some of which are suitable for use in medium and heavy breeds of dogs.

Two cases of fractured radius and ulna were treated by open reduction and plating of the radius only. In both operations, which will be described, a Sherman type Vitallium plate was used.

Vitallium is the name given to an alloy of cobalt, chromium and molybdenum produced by the Austenal Laboratories, New York, U.S.A. The metal is claimed to be entirely inert and free from foreign body reaction. It may be left indefinitely within the living tissues and in articular situations is said to have no unfavourable effect on cartilage or synovia. The writer, while fully aware of the wide extent to which Vitallium is used and the trials to which it has been subjected, does not feel it out of place to state that personal experience in the two cases of bone plating referred to and in the limited use of Vitallium bar bolts and transfixion screws supports the claims of the makers.

Radius: Case No. 1

Subject.—Greyhound dog aged 18 months. Weight 65 lb.

The animal was presented with a ten days old comminuted fracture of the left radius and ulna with a history that after injury every effort had been made under general anæsthesia to restore proper alignment. The displacement of the fragments, as seen from Illustration No. 8, if uncorrected would certainly have terminated the animal's history as a racing greyhound.

Manipulative Treatment.—Before open reduction was attempted all attempts at closed reduction by traction and manipulation under general anæsthesia failed.

Operation.—After routine preparation of the skin the fracture site was exposed by a skin incision 10 cm. in length slightly lateral to the midline, and by subsequent separation and retraction of the extensor carpi radialis from the common digital extensor. A generous field of the radial shaft can be safely exposed by this approach. While traction was applied to the limb by an assistant the fibrous tissue interposed between the fragments was cleared and the fracture reduced by leverage. A No. $6\frac{1}{2}$ four-holed Vitallium plate was bridged over the radial fracture site parallel to the long axis of the bone and slightly medial to the midline. It was ensured that the fracture site was equidistant from the proximal and distal extremities of the plate. A simple technique for the insertion of the screws was adopted. A twist drill of a diameter correctly related to that of the Sherman screw was used to bore transversely through both cortices of the radius via the hole in the proximal extremity of the plate, and this was followed by a Sherman $\frac{3}{4}$ in. screw driven in with a 5 in. stainless steel screwdriver. The proper relation of the bore and screw diameters resulted in the screw biting firmly when it reached its position of maximal penetration. A final check on alignment was made prior to both cortices of the distal fragment being drilled via the hole in the plate at the distal extremity. Into this bore a screw was driven to its full extent and the remaining two screws inserted in the same manner. At this stage it was noted that the ulnar fracture had very satisfactorily undergone spontaneous reduction. The wound was then closed by routine technique. A light metal splint was applied to the limb from elbow to paw and

worn for three weeks after the operation. The wound healed by first intention and some weight was taken on the limb after fourteen days. The plate was removed under general anæsthesia sixty-nine days after operation, and at no time was any evidence of foreign body reaction noted. On the sixty-seventh day after the removal of the plate (136 days after operation) the dog ran in a graded race on a licensed London track and finished in fourth place. (See Illustrations Nos. 8, 8A, 8B, 8C, and 8D.)

Radius: Case No. 2

Subject.—Alsatian bitch aged 5 months. Weight 45 lb.

The animal was presented in order that an attempt should be made to reduce a three days old displaced fracture of both left radius and ulna at about the junction of the middle and lower thirds. As in the previous case, every available means of closed reduction of the fracture were adopted under Nembutal anæsthesia, but without success. In the circumstances it was decided to carry out an operation on the same plan as that used in the previously described case. The same approach and technique were adopted. No evidence of foreign body reaction could be observed at any time and the plate was removed 25 days after operation. Callus formation in the growing bone had been rapidly progressive and immediately prior to the removal of the plate lameness appeared to be only slight. One week after the removal of the plate function of the limb was almost normal. A light metal splint had been used to support the limb for 15 days after the plating operation.

(See Illustrations Nos. 9, 9A, 9B, and 9C.)

Summary

It is maintained that closed reduction and external fixation of bone fractures in small animals is frequently unsatisfactory on account of the difficulty of providing adequate traction and subsequently maintaining sufficiently good extension and support. For these reasons it was essential that methods of open reduction and internal fixation should be explored.

The inert nature of stainless steel, its suitability for intramedullary pinning, together with the bacteriostatic effects of penicillin and sulpha compounds have made the open reduction and internal fixation of certain bone fractures a reasonably safe operative procedure. X-ray examination is indispensable.

Thirty-seven cases of intramedullary pinning with stainless steel rod are recorded and the technique of operation described in detail in the case of the femur, tibia, and humerus. The radius, in one case, was treated by intramedullary pinning, but the bone was not considered suitable for internal fixation by this means. An alternative was employed in two cases in the form of Sherman (Vitallium) plate and screws. Of the thirty-seven intramedullary pinning cases, six resulted in failure, three were not presented for re-inspection and, at the time of writing, four were current but expected to progress favourably. In twenty-four cases the results were all satisfactory and considered to be well above the average standard to be expected from closed reduction and

external fixation methods. Although only two cases of Sherman (Vitallium) plating are cited the results proved outstandingly successful.

It is believed that, from the evidence provided, intramedullary pinning with stainless steel in small animal fractures must now be regarded as a normal surgical procedure in certain bone fractures.

Acknowledgments

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CANINE BABESIASIS: THE PROBLEM OF PARASITE FASTNESS AND THE BILIARY FEVER RELAPSE

Trials with "Paludrine" as a Therapeutic Agent

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TOLERANCE or "fastness" by bacteria against chemotherapeutic drugs such as the sulphonamides and penicillin has already been demonstrated. An analogous condition is seen in the Eastern Cape Province of South Africa where the Blue Tick, following years of struggle against standard dips, has acquired a very high resistance to Arsenic.

In tropical and subtropical areas where piroplasmosis is prevalent it has been felt that, given time, the Hæmosporidia would eventually acquire a tolerance to the drugs which have been in use over a number of years. As far as canine babesiasis is concerned this stage is rapidly being approached and to-day the canine piroplasm has developed a marked resistance to the usual biliary fever therapeutic agents.

Over the past 30 years trypanblue has been used with a great deal of success against B. canis. In certain areas it is still effective, but elsewhere the drug appears to have lost its power to kill the parasites *in vivo*. To a much lesser degree the same may be said of the complex synthetic chemicals such as dimethylquinolylmethyl-sulphate urea—"pirevan" and diamidinodiphenylether-dihydroxyethanesulphonate—"phenamidine," although both these drugs are still used extensively throughout the Union of South Africa and the Rhodesias.

In recent years it has been noted that the incidence of the biliary relapse is increasing despite adequate, repeated and sometimes "heroic" doses of these drugs together with rigid control of the patient during convalescence. To-day the problem is becoming more acute; not only has the relapse to be dealt with, but in ever-increasing frequency there are cases which show no response whatsoever to the above-mentioned drugs.

A favourable response generally manifests itself within 24 to 48 hours after injection. The temperature drops, parasites disappear from the blood and appetite and spirits return to normal even although the concomitant anæmia may still be present. Non-responses are self-explanatory and are indicated by persistence of the parasites in the blood and elevated temperatures even after 48 hours. When two injections are given at either 24 or 48 hour intervals it is generally possible to determine without recourse to the microscope those cases which are responding. In a proportion of cases poor or non-responses are probably due to variant types of parasites. The aforementioned drugs are lethal to B. canis but not to B. gibsoni, which is morphologically similar to B. canis but smaller. Routine smear examination fails to distinguish the species.

The true relapse occurs between the 10th to 16th day after an apparently successful initial treatment. Occasionally it may come as early as the sixth day after treatment and as late as 30 days. Repeated relapses tend to follow each

other at decreasing intervals. Differentiation between a relapse and a fresh infection is not always easy; it is unusual, however, to get a reinfection within three months. Microscopically, "relapse" parasites show degenerative or resistant morphological changes and lose their piriform shape. The tendency is for single round forms to occupy the R.B.C's, but this is not an invariable characteristic and as many as 6 to 12 pear-shaped double parasites may be found in the blood cells.

In the cases to be described later the term relapse is used when there has been an apparent, if temporary, improvement during which parasites were not demonstrable in the peripheral blood stream, temperatures were normal and appetite and spirits good. When relapses occur two injections of N.A.B. (novarsenobillon) of varying strength according to weight are given intravenously with an interval of three days between. Until comparatively recently the relapses (in B. canis infection) and the poor initial response (probably due to B. gibsoni or a resistant form of B. canis) have been successfully treated by this method.

When a second relapse has occurred trypanblue intravenously has been used in a single injection. If the parasites prove resistant to this treatment two injections of acriflavine with an interval of three days between are given, but it has been my experience that cases which fail to respond to trypanblue are generally resistant to acriflavine and vice versa.

When the full range of these drugs has been exploited there remains the problem of the case which is still showing all the usual symptoms of biliary fever, viz., positive blood smear, fever, anæmia and probably jaundice.

The number of such cases is increasing and within the past 12 months the incidence of successful treatments with only two initial injections has dropped considerably and some 35 to 45 per cent of cases are coming back with repeated relapses or poor responses.

In an effort to meet these changed conditions the possibility of utilising the newer antimalarial drugs has been explored. Paludrine hydrochloride per os and the soluble salt paludrine lactate 5 per cent w/v by intramuscular injection have been used in a number of selected cases.

Tolerance.—In the main dogs appear to tolerate paludrine per os very well even in relatively large doses of .2 gm. per day. Dosage varied according to the weight of the animal from .05 gm. to .2 gm. daily and the course extended over 10 days. Only two animals (not included in this report) did not tolerate the drug. When given intramuscularly paludrine lactate has been used in doses of 2 c.c. to 4 c.c., again according to weight. A severe local reaction develops at the site of injection with considerable swelling, tenderness and œdema. No sloughing has been noted so far and in the cases successfully treated there has been no systemic disturbance notwithstanding the local reaction.

Very brief reports of 12 selected cases are given where paludrine per os and intramuscularly has been used.

Case I.—SPANIEL.

31.10.47	Pos. Sm.		Inj. Phenamidine.
30.12.47	Pos. Sm.	Relapse.	Inj. .30 N.A.B.
2. 1.48	Pos. Sm.		2nd Inj. .30 N.A.B.
3. 3.48	Pos. Sm.	Relapse.	Inj. Trypanblue.
8. 3.48	Pos. Sm.	Relapse.	.1 gm. Paludrine per os daily for 10 days.
12. 3.48	Neg. Sm. Recovered.		

Case II.—DANE.

31.12.47	Pos. Sm.		Inj. Pirevan.
2. 1.48			2nd Inj. Pirevan.
5. 1.48	Pos. Sm.	No response.	Inj. .45 N.A.B.
8. 1.48			2nd Inj. .45 N.A.B.
4. 2.48	Pos. Sm.	Relapse.	Inj. Acriflavine.
8. 2.48	Pos. Sm.	No response.	Inj. .60 N.A.B.
9. 2.48			Inj. .60 N.A.B.
10. 2.48			Inj. .60 N.A.B.
14. 2.48	Pos. Sm.	Relapse.	Inj. Trypanblue.
19. 2.48	Pos. Sm.	Relapse.	.2 gm. Paludrine per os daily for 10 days.
29. 2.48	Neg. Sm.		

The second course of N.A.B. was given inadvertently by a colleague who was unaware of the previous history.

Case III.—SPANIEL.

25. 3.48	Pos. Sm.		Inj. Phenamidine.
27. 3.48	Pos. Sm.	No response.	Inj. .30 N.A.B.
30. 3.48			2nd Inj. .30 N.A.B.
22. 4.48	Pos. Sm.	Relapse.	Inj. Pirevan.
23. 4.48	Pos. Sm.	No response.	Inj. Trypanblue.
8. 5.48	Pos. Sm.	Relapse.	Inj. 2 c.c. Paludrine.
10. 5.48			2nd Inj. 2 c.c. Paludrine.
12. 5.48			3rd Inj. 2 c.c. Paludrine.
			Paludrine .1 gm. per os daily for 10 days.
19. 5.48	Neg. Sm. Recovered.		

Case IV.—ALSATIAN.

15. 6.48	Pos. Sm.		Inj. Pirevan.
16. 6.48			2nd Inj. Pirevan.
29. 6.48	Pos. Sm.	Relapse.	Inj. .45 N.A.B.
2. 7.48	Pos. Sm.	No response.	Inj. Trypanblue.
5. 7.48	Pos. Sm.	Relapse.	Inj. Acriflavine.
8. 7.48			2nd Inj. Acriflavine.
11. 7.48	Pos. Sm.	Relapse.	Inj. 4 c.c. Paludrine.
14. 7.48	Neg. Sm.	Local reaction.	.1 gm. Paludrine per os daily for 10 days.
20. 7.48	Neg. Sm. Recovered.		

Case V.—RIDGEBACK.

29. 6.48	Pos. Sm.		Inj. Pirevan.
30. 6.48			2nd Inj. Pirevan.
21. 7.48	Pos. Sm.	Relapse.	Inj. .45 N.A.B.
24. 7.48			2nd Inj. .45 N.A.B.
31. 7.48	Pos. Sm.	Relapse.	Inj. Trypanblue.
8. 8.48	Pos. Sm.	Relapse.	Inj. 2 c.c. Paludrine.
			.1 gm. Paludrine per os daily.
9. 8.48			2nd Inj. 2 c.c. Paludrine.
12. 8.48	Pos. Sm.	No response.	Inj. Phenamidine.
14. 8.48	Neg. Sm. No further breakdown.		Paludrine per os continued.

Case VI.—DOBERMAN.

29. 7.48	Pos. Sm.		Inj. Pirevan.
30. 7.48			2nd Inj. Pirevan.
19. 8.48	Pos. Sm.	Relapse.	Inj. 4 c.c. Paludrine.
			.1 gm. Paludrine per os daily.

31. 8.48	Neg. Sm.		
	Recovered.		

Case VII.—BOXER.

3. 9.48	Pos. Sm.		Inj. Phenamidine.
4. 9.48			2nd Inj. Phenamidine.
11. 9.48	Pos. Sm.	Relapse.	Inj. .30 N.A.B.
12. 9.48			.1 gm. Paludrine per os daily.
14. 9.48			2nd Inj. .30 N.A.B.
18. 9.48	Neg. Sm.		
	Recovered.		

Case VIII.—MASTIFF X.

14. 8.48	Pos. Sm.		Inj. Pirevan.
16. 8.48			2nd Inj. Pirevan.
21. 8.48	Pos. Sm.	Relapse.	Inj. .30 N.A.B.
24. 8.48			2nd Inj. .30 N.A.B.
31. 8.48	Pos. Sm.	Relapse.	Inj. Trypanblue.
			.05 gm. Paludrine per os daily.
4. 9.48	Pos. Sm.	Relapse.	Inj. Acriflavine.
15. 9.48	Pos. Sm.	Relapse.	Inj. Phenamidine.
			Paludrine discontinued. Nausea.
17. 9.48			2nd Inj. Phenamidine.
	Recovered slowly.		

Case IX.—ALSATIAN.

15. 9.48	Pos. Sm.		Inj. Phenamidine.
19. 9.48	Pos. Sm.	No response.	Inj. 4 c.c. Paludrine.
			.1 gm. Paludrine per os daily.
23. 9.48	Neg. Sm.	Local reaction.	
	Recovered.	No further treatment required.	

Case X.—DANE.

1. 9.48	Pos. Sm.		Inj. Phenamidine.
12. 9.48	Pos. Sm.	Relapse.	Inj. .45 N.A.B.
15. 9.48			2nd Inj. .45 N.A.B.
20. 9.48	Pos. Sm.	Relapse.	Inj. 4 c.c. Paludrine.
			.1 gm. Paludrine per os daily.
25. 9.48	Neg. Sm.	No local reaction	
	Recovered.		

Case XI.—RIDGEBACK.

2. 9.48	Pos. Sm.		Inj. Pirevan.
3. 9.48			2nd Inj. Pirevan.
10. 9.48	Pos. Sm.	Relapse.	Inj. .45 N.A.B.
13. 9.48			2nd Inj. .45 N.A.B.
28. 9.48	Pos. Sm.	Relapse.	Inj. 3 c.c. Paludrine.
			.1 gm. Paludrine per os daily.
	No further breakdown to date.		

Case XII.—DOBERMAN.

1. 9.48	Pos. Sm.		Inj. Pirevan.
2. 9.48			2nd Inj. Pirevan.
8. 9.48	Pos. Sm.	Relapse.	Inj. Trypanblue.
12. 9.48	Pos. Sm.	Relapse.	Inj. 2 c.c. Paludrine.
			.1 gm. Paludrine per os daily.
	Recovered.		

Discussion and Summary

Without producing any conclusive results, the above-mentioned cases indicate that paludrine given orally and by intramuscular injection may be beneficial in the treatment of canine piroplasmosis due to B. canis and possibly B. gibsoni. Cases No. V and VIII, however, show that it is not successful in

all instances, either orally or by the intramuscular route, even in relatively large doses. Further experiments are required to test its therapeutic value when given as an initial treatment.

I am indebted to Messrs. Imperial Chemical (Pharmaceuticals), Ltd., Manchester, and Messrs. African Explosives (Pharmaceutical Division), Ltd., Johannesburg, who kindy supplied the material.

THE ACTION OF PHENOTHIAZINE ON PURE INFESTATIONS OF TRICHOSTRONGYLUS AXEI IN SHEEP

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IT is now well established that phenothiazine is the best anthelmintic for the treatment of parasitic gastritis in sheep, but there is little information to be found on its relative efficiency against the various species of trichostrongylid nematode which may be present in an infected animal. Most of this information has been derived from observations in sheep carrying mixed infestations, and it seems desirable, whenever possible, to secure more accurate data by experimental treatment of sheep carrying pure infestations. The present paper records a series of controlled tests, using different doses of phenothiazine, in sheep in which pure infestations of *Trichostrongylus axei* had been set up artificially.

Materials and Methods

Fifteen cross-bred Down sheep, whose ages varied from 12-17 months, were used in the experiment and were divided into five groups, of two, three or four sheep each. Pure infestations of *Trichostrongylus axei* were established by the administration of 6,000 infective larvæ to each sheep every day for 25 days. One sheep in each of groups I to IV, and two sheep in group V, were kept as controls, and the others were given different doses of phenothiazine, the drug being administered four weeks after the last dose of larvæ had been given. The doses of phenothiazine which were used were 5, 10, 15, 20, 25, 30, 40 and 50 grams. One week after treatment both treated and control sheep were slaughtered and the number of *Trichostrongylus axei* present in the abomasum was estimated by the dilution technique described by Taylor (1934).

Results

The results of the experiment are recorded in Table I, in which each of two dilution counts that were carried out on the abomasal contents of each sheep are recorded along with the estimated number of *Trichostrongylus axei* present, calculated from the average of these two counts.

The different groups of sheep are of slightly different ages and groups III

and IV were from a different source from the rest. Also, batches of larvæ used for setting up the infestations of *Trichostrongylus axei* were of different ages for the different groups. For these reasons it seems more fitting to compare the sheep within each group than to compare groups, and the percentage efficiency given in the last column of the table has been calculated by comparing the number of worms eliminated from each sheep with the number found in the control sheep of each respective group. These data have been plotted in Graph No. 1. The worm count data have also been presented graphically by plotting "log a (1+x)" against dosage; "a" is the dilution factor and equals 100, and "x" is the average of the two dilution counts recorded in Table I. The data obtained in the field trial organised by the Agricultural Research Council in 1943 (Anon, 1943) were recorded in this manner, and the graph of log a (1+x) for *Trichostrongylus axei* from the report of the trial is shown in Graph No. 2 as a broken line.

The present experiment demonstrates that doses of phenothiazine of 15 grams and over have a high efficiency against *Trichostrongylus axei,* but that a dose of at least 40 grams has to be given to achieve 100 per cent efficiency. A dose of 5 grams was seen to be almost without effect and one of 10 grams was only 63 per cent efficient. The graph of log a (1+x) against dosage shows little variation from that recorded in the report of the Agricultural Research Council field trial, referred to above.

TABLE I

Group	Age of lamb	Dose of phenothiazine	Number of *Trichostrongylus axei* counted in two samples of 1/100th of the volume of the diluted abomasal contents		Estimated number of *Trichostrongylus axei* present in the abomasum	Percentage efficiency of the drug
I	12½ months	5 grams	573	607	59,000	10%
	12½ „	10 grams	255	237	24,600	63%
	12½ „	Control	665	653	65,900	—
II	14 months	15 grams	64	57	6,050	86%
	14 „	20 grams	19	19	1,900	96%
	14 „	25 grams	12	8	1,000	98%
	14 „	Control	452	452	45,200	—
III	16 months	30 grams	37	26	3,150	94%
	17½ „	Control	495	518	50,700	—
IV	11 months	30 grams	26	27	2,650	87%
	11 „	Control	208	211	20,950	—
V	15 months	40 grams	0	0	0	100%
	14½ „	50 grams	0	1	50	100%
	14½ „	Control	253	249	25,100	—
	14½ „	Control	220	216	28,800	—

Discussion

Since phenothiazine was introduced as an anthelmintic, many millions of sheep, carrying mixed infestations of trichostrongylid worms, have been successfully treated, but only one or two investigations have been reported in which the efficacy of the drug against *Trichostrongylus axei* has been specifically determined. Swales (1943), in a report on four years' experience on the use of phenothiazine as an anthelmintic in Eastern Canada, states that the reduction in incidence of *Trichostrongylus axei* during the period was 77.8 per cent. The report of a field trial organised by the Agricultural Research Council in 1943 (Anon, 1943) states that doses up to 20 grams are effective and that at this dosage level 50 per cent or more of the treated sheep were free from infestation. Doses above 20 grams did not appear to have an effect significantly superior to that of the 20 gram dose. As indicated above, very similar results were obtained in the present small investigation.

Of late, an increasing number of verbal reports from the field suggest that phenothiazine is becoming less efficient as an anthelmintic in sheep than formerly, and it has been suggested that where regular phenothiazine treatment has been given the worms are becoming " drug-resistant." It seems more likely, however, that since phenothiazine is relatively expensive, there is a tendency for purposes of supposed economy to reduce the dose below the minimum recommended by the manufacturers. Since the chemical firms usually recommend the minimum effective dose of phenothiazine, such reduction is dangerous and may result in only low efficiency in eliminating *Trichostrongylus* spp. from sheep.

The number of sheep used in the present experiment is small and a generalisation from the results would be dangerous, but when considered along with other evidence in the literature, they are sufficiently definite to show that 20-30 grams is an efficient dose in eliminating *Trichostrongylus axei* from adult sheep and that it is unwise to reduce the dose below that level. In this country most of the chemical firms who sell phenothiazine recommend 20-30 grams of phenothiazine as the therapeutic dose for adult sheep, as did the Survey Committee of the N.V.M.A. in 1944 (Anon, 1944). In Australia, Gordon (1945) recommended 16-34 grams for the smaller merino sheep and points out that they require a smaller dose than some of the larger breeds found in other parts of the world. In Canada, where œsophagostomosis is a problem, Swales (1941) recommends doses of 36-48 grams, but says that 24-36 grams is a suitable dose for sheep suffering from trichostrongylosis. There is therefore ample evidence to suggest that the therapeutic dose of phenothiazine for adult sheep should be 20-30 grams and that reduction would be inadvisable since a smaller dose would result in only partial elimination of *Trichostrongylus* spp. from the sheep.

Summary

A small experiment carried out on 15 adult sheep showed that a dose of 5 grams of phenothiazine was practically ineffective against pure infestations

of *Trichostrongylus axei*. Ten grams was only 63 per cent efficient and it was necessary to give a 20 gram dose in order to obtain 96 per cent efficiency. One hundred per cent efficiency was not attained until the dose was increased to 40 grams.

In view of these findings, it is concluded that doses of 20-30 grams of phenothiazine must be given to sheep suffering from trichostrongylosis if control of the disease is to be attained. It is suggested that the reported failure of phenothiazine to control outbreaks of parasitic gastritis in the field may have been due to the expensive nature of the anthelmintic and the reduction of the dose to a point at which it is inefficient against *Trichostrongylus* spp.

Acknowledgment

I am greatly indebted to Dr. E. L. Taylor for his interest in this work and for his assistance in the preparation of this paper for publication.

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NOTES ON PULLET DISEASE

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General

PULLET disease, also variously called "Blue Comb" disease, "Summer" disease, "X" disease and "Contagious Indigestion," is probably a comparative newcomer to the list of poultry ailments. Apparently it was recognised in the United States in 1929, and a similar disease was first reported in Britain in 1944. The choice of name for this condition is somewhat arbitrary, but since information on pathogenesis is still meagre, the designation "pullet" disease has been retained. The handbook of the National Veterinary Medical Association (No. 15 Poultry Diseases, 1948) states: "Pullet disease primarily affects young, mature chickens in the early stages of production, and sometimes turkeys. Growing chickens, two-year-old fowls and males are susceptible. Pullet disease may occur on a sporadic or epidemic scale, and may take an acute, sub-acute

or chronic course in individual cases. Whilst the morbidity is usually high, mortality seldom reaches serious proportions. Outbreaks may occur at any time throughout the year, but are most frequent during the summer and autumn months. . . . The condition usually begins suddenly with loss of appetite and marked fall in egg production. . . . The crop is frequently distended with sour-smelling, doughy foodstuff. The vent feathers are soiled as a result of diarrhœa, which may be green to white in colour. The comb, wattles and shanks may be cyanotic and the face hollow. Some cases, particularly on excitation, may show trembling symptoms. Fever and gasping may be present in others."

A Ministry of Agriculture Leaflet (1946) states that fowls principally affected are pullets six to eight months old, and usually those in early or commencing production. The symptoms given are dullness, off-feed and sometimes diarrhœa. There is rapid loss of condition.

A Poultry Leaflet (B.O.C.M. Poultry Service, 1948) ascribes the symptoms to destruction of the kidneys, but states that nothing is known as to the cause of the disease.

Towards the end of August 1948, our attention was drawn to a considerable outbreak of suspected coccidiosis in a large poultry undertaking in Northumberland. Post-mortem examination on two birds showed no evidence of coccidiosis, but on the contrary disclosed several features consistent with so-called pullet disease. For example, the carcases showed signs of visceral gout, and the crops and gizzards were semi-impacted with coarse, fibrous grass. A tentative diagnosis of pullet disease was given, and this opinion was supported by the Ministry of Agriculture's Poultry Laboratory at Lasswade, where another carcase from the same outbreak was examined. Owing to the serious loss in production occasioned by this outbreak of pullet disease, it is perhaps of interest to report briefly on the main features observed in the various stages of this outbreak.

Northumberland Outbreak

The disease occurred in a large poultry farm comprising 5,000 head, of which about 4,000 were 1948-hatched pullets and the remainder older hens. The poultry are divided into 21 contiguous holdings each running 90 to 250 pullets, and a smaller number of older birds. Replacements for the undertaking are obtained as day-old chicks from external hatcheries, and distributed to the smallholders upon arrival. Rearing is undertaken in fold brooders for eight weeks, and thereafter in fold units. A proportion of these chickens are run permanently in fold units, but the majority are transferred at four to five months old to semi-intensive houses known as cabins. These are about 24 ft. by 12 ft. and abut on two grass enclosures which are alternately occupied and shut. Each cabin houses about 80 birds. The feedstuffs are purchased centrally and allocated as required. When the outbreak occurred the principal feedstuff was commercial laying pellets fed in hoppers: very little grain was given. General management of this poultry undertaking is maintained at a reasonably

high standard, and is supervised by an experienced resident poultryman. The disease was noted on 13 of the 21 holdings, but its appearance was discontinuous in time and place, and consequently unlike that of a contagious disease.

On August 4 Holding "Ajax" reported a sudden drop in egg yield from pullets, accompanied by severe diarrhœa affecting all the birds in one cabin. Since the droppings contained reddish spume the poultryman suspected coccidiosis and forthwith recommended treatment with sulphamezathine. After three days' treatment the diarrhœa ceased, but the birds were listless and off-feed. The egg yield remained low for ten days and then gradually increased, reaching par four weeks after the onset of symptoms. There were no deaths from the disease, but three affected birds were killed for examination.

An additional ten outbreaks occurred within three weeks, and two later outbreaks were noted in September. Affected birds were forwarded to the laboratory for examination. The following is a detailed history from several holdings:—

Holding "Ajax."—This holding carried 135 R.I.R. pullets, of which 65 were hatched in February and 70 in April. These birds occupied adjacent cabins, each with an outrun on a young ley. Feeding consisted of layers mash or pellets three times daily. A few sheaves of grain were thrown into the runs occasionally. Trouble appeared among the February-hatched pullets, which by the end of July were averaging 40 eggs per day. From July 29 the egg yield for the successive days was 37, 21, 15, 15 and 9. The droppings were very watery and of a slatey-grey colour, and capped with a small amount of pink-coloured spume shaped like a gut cast.

The watery part of the droppings was most noticeable and caused a minor flood on the dropping board: the droppings had an offensive smell. The birds were off-feed and listless, dull looking about the face, comb and wattles, and several combs appeared to be blue in colour. The eyes seemed glassy bright; feet cold and clammy; and the birds moved with a stilted gait. Sulphamezathine treatment was prescribed by the poultryman, and after three days the diarrhœa stopped, and shortly afterwards the birds began to improve in appetite and appearance. For some weeks, however, the birds evinced a noticeable craving for coarse, fibrous grass. The egg yield remained low for ten days, and four weeks elapsed before production returned to par. This was succeeded by a full moult and a further drastic fall in egg yield. Two months later the birds were in poor condition and the droppings showed much undigested grass.

The 70 April-hatched pullets showed the typical diarrhœa on August 10. This lasted for three days and sulphamezathine was administered. There was little loss of condition and these pullets started to lay on September 23. This presumably was a mild attack which did not retard development. For some weeks after recovery the droppings were light in colour and contained much fibrous material.

Holding "Baltic."—This holding carried 240 pullets in three cabins and 80 in fold units. The birds in the cabins were January and February hatched and had an outrun alternately on old and new grass. The pullets in the fold

units were April hatched, and were moved daily on a young ley. All birds were given laying pellets three times a day and were in good condition.

Cabin No. 1 housed 80 Light Sussex pullets which started to lay in July. Diarrhœa was observed on September 16. All birds seemed to be affected, and the egg yields from September 17 to 22 were 31, 20, 7, 10, 5 and 7. The condition of the birds was identical with that observed on Holding "Ajax." On September 16 the birds were treated with sulphamezathine. Bran and dry milk powder was substituted for laying pellets at this time. Two birds died showing blue combs; these deaths occurred 2 days after the diarrhœa commenced. When seen on September 23 the birds appeared to be anæmic. The appetite was said to be returning, and the majority of the stools were reasonably firm, but yellowish in colour, and contained large amounts of fibrous undigested grass. Cabin No. 2 contained 80 Light Sussex pullets January hatched. The first indication of trouble was a slight drop in the egg production commencing September 16. The following were the daily yields: 37, 26, 18, 24, 17 and 12. The characteristic diarrhœa was noted on September 21, and treatment with sulphamezathine was given on September 22. The following day the droppings had improved, but the birds remained very listless, off-feed and a number showed blue comb. This was the only cabin in which the pullets showed the blue comb noticeably. No deaths occurred. Cabin No. 3 contained 80 R.I.R. pullets hatched in February. In this cabin the drop in egg yield coincided with the appearance of the typical droppings, and from September 21 the egg yields were as follows: 34, 28 and 18. These birds received no drug treatment, but the watery droppings persisted only for three days, just as was observed in the other cabins where the pullets were treated with sulphamezathine. The birds in this cabin did not seem to go off-feed, but showed a marked craving for grass.

On Holding "Baltic" there were 80 R.I.R. pullets running in fold units on first year's ley. Production from these pullets started in mid-September and reached 40 eggs per day by September 26. During the next few days the egg yield from all units dropped sharply, and the pullets were off-feed, very listless, and the eyes were glassy bright. The droppings were soft, contained much fibre, but were not noticeably watery. Egg yield nil: three deaths occurred, but three weeks elapsed before the birds had noticeably improved.

Holding "Cotex."—This holding carried 230 R.I.R. pullets hatched January, February and April. The birds in this unit were particularly well fed and managed and in exceptionally good condition, consuming about 7 ozs. layers pellets daily. The pullets ran in two cabins and four fold units. A mild form of pullet disease appeared in one cabin on September 16, but did not spread to the other pullets. The droppings were grey and loose and free from pink spume: not watery. Egg yield gradually dropped from 65 to 25 eggs per day. This gradual, as distinct from a sudden, drop was perhaps due to the onset of a neck moult, and egg production remained low for several weeks. The other birds on this holding showed no evidence of pullet disease although looked after by the same attendant.

Table I shows the morbidity rate of pullet disease under various types of management.

TABLE I

System	No. affected	No. unaffected	Nett totals	Gross totals
Pullets in cabins (old grass) ...	240†	500	740	
Pullets in cabins (new grass)* ...	1,420	246	1,666	2,406
Pullets in fold units (old grass) ...	0	170	170	
Pullets in fold units (new grass) ...	160	955	1,115	1,285
Number of holdings	13	8		21
Cabins (old grass)	3	6		9
Cabins (new grass)	18	3		21

* First and second years ley.

† These birds were running on old and new grass alternately at fourteen-day intervals.

Post-mortem Appearance

Four birds were examined.

No. 1—Carcase in fair condition. Duodenum contained an abnormal amount of undigested grass which was extracted in the form of a cast. Petechial hæmorrhages in part of gut. No worms or coccidia detected. There was a number of pin-head-sized yellow foci on liver. The kidneys were slightly enlarged and dark in colour: uric acid deposits on surface of all organs.

No. 2—This examination disclosed an appearance similar to No. 1—no notable differences.

No. 3—Affected about five days: carcase thin. Droppings were fairly firm. The comb was noticeably blue, but bird had been feeding and crop seemed full: contents doughy and sour. The proventriculus, gizzard and first part of the duodenum were quite tightly impacted with mass of twisted grass. There was evidence of alimentary stasis. Kidneys appeared normal. No worms or coccidia present. No bacteria isolated from organs.

No. 4—Carcase in poor condition. The gut contained one long roll and several shorter plugs of undigested grass causing apparent complete obstruction. The kidneys were degenerated, enlarged, light in colour, and the cortical vessels were congested and showed up as a reddish meshwork on a paler background. This bird had not been treated with sulphamezathine, and the nephritis was therefore not due to drug treatment. The liver was rather blotched with lighter streaks: no yellow spots.

Report on Bird Examined at Lasswade

Kidneys were a little enlarged, a mottled light and dark brown, and lobules clearly marked. The intestines were lengthened, grey and flaccid. No parasites found.

No transmission experiments were carried out, but the discontinuous spread of pullet disease to the various holdings on this poultry farm did not suggest a contagion. The disease manifested itself as an acute indigestion with consequent

nephritis, and it seemed clear that the feeding and management were contributory or predisposing of Holding " Cotex." The staple feed (layers pellets) was analysed by the Chemistry Department, who reported a probable deficiency of vitamin B and a shortage of the precursor of vitamin A. The manganese figure was border-line to low. With regard to feeding, the speedy transition from growers pellets to layers pellets indicates that feeding was on rather forcing lines, egg production commencing at 5 to 5½ months. The onset of egg production in pullets must divert relatively large quantities of protein, mineral matter as well as vitamins, egg yolk being a rich source of vitamin B. If the capacity of the hen to store this vitamin is limited, digestive trouble is a possible sequel.

On Holding " Cotex " a feeding experiment was carried out on four fold units. Brewer's yeast (5 per cent), potatoes and wheat feed were added to the diet in each unit, one being left as a control. No pullet disease occurred in any of these units, but it is of interest to record that until Christmas the egg yield was much better maintained in the unit which received brewer's yeast.

Summary

The foregoing contains a brief description of an outbreak of pullet disease on a large poultry farm in Northumberland. The symptoms shown were severe watery diarrhœa, sudden drop in egg yield, dejection, some blue combs, stilted gait, marked loss of appetite and a craving for coarse, fibrous grass. The disease was confined to pullets four to six months of age, mostly commencing to lay. The morbidity rate was high and the mortality rate low. There was perhaps no very definite co-relation between dietary changes and outbreaks of pullet disease. Post-mortem changes noted were indigestion, alimentary obstruction and nephritis. Sulphamezathine was used to control the diarrhœa, and it is probable that this drug was not responsible for the observed nephritis. The precise cause of pullet disease is not known, but it may be the manifestation of an acute indigestion with subsequent nephritis caused by an as yet undetected dietetic factor. Analysis of the staple feed showed it to be low in vitamins A and B. Out of 1,820 birds affected, 87 per cent were running on young leys (first and second year), 240 or 13 per cent were alternately on old and young leys. Since sulphamezathine may react unfavourably on an inflamed kidney, this drug would seem to be contra-indicated.

AN ACARDIAC MONSTER FROM A COW

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THE case recorded is of the type *Amorphus globossus* (Gurlt), also referred to as an anidian monster or "mole." Similar cases have been reported in the literature, but the opportunity presented to examine the specimen in some detail suggested it as worthy of record.

History.—A non-pedigree, non-recorded, shorthorn cow with a history of three previous normal calvings, delivered a normal full-term heifer calf. Shortly afterwards she shaped to deliver a twin and expelled the monster to be described which was contained within the placenta of the normal calf. The dam had been impregnated by artificial insemination from a pedigree shorthorn bull.

External Appearance (see Fig. 1).—The specimen consisted of a hair-covered spherical mass 440 gm. in weight with a circumference of 35 cm., greatest length 12 cm., greatest width 7 cm. One surface was convex and nondescript, the other slightly concave with a centrally placed umbilicus and contained blood vessels. "Cranial" to the umbilicus were two strongly curved ridges enclosing a central depression of hairless skin leading to a blind pocket, while "caudal" to the umbilicus was a similar but less defined pit. Subsequent examination suggested these as the stomodeal and proctodeal depressions respectively.

Dissection Findings (see Fig. 2).—Sagittal section revealed a distinct dermal layer of up to 6 mm. thick beneath the hair-covered epidermis, and a central mass of undifferentiated tissue richly interspersed with blood vessels and fat. Dissection demonstrated two reticular areas, one approximate to the umbilicus which was taken to be the liver, and a smaller area, more central, which possibly represents an effort at lung formation. Only one area of bone was present, in the form of an irregularly shaped hollow sphere taken to be the skull. At a deeper level was a blind endothelial pouch; it was impossible to identify this as any definite part of the alimentary tract, but the presence of internal ridges and pocketing suggested the compound stomach. The blood vessels did not follow any established pattern, but there was evidence of a circulation, and in many areas, particularly at the junction of the dermis with the central mass, numerous arcuate vessels were present.

Discussion.—Gurlt, in his description of teratological specimens, records contact with 11 cases of this type in cattle, 10 one of twins and one a triplet. According to Gurlt, in most cases no viscera are present; although he refers to one case where a spleen and a blind alimentary sack, in which all compartments of the stomach could be recognised, was observed. He mentions also the usual presence of large quantities of adipose tissue. Kitt summarises these specimens as consisting of skin fat and connective tissue, with possibly cartilage and bone and an umbilical artery and vein. The most constant external feature in other recorded cases is a well developed umbilicus. Bland

Sutton refers to a case with which he came in contact and quotes the description of the farmer as "when the after-birth was discharged it had this hairy ball attached to the membrane by a navel-string," and Williams, that they are attached to the navel cord of the twin, the heart of which sustains the circulation of the monster.

Williams also discusses the cause of this type of monster and states that two theories have been advanced: unequal fission of a fertilised ovum and

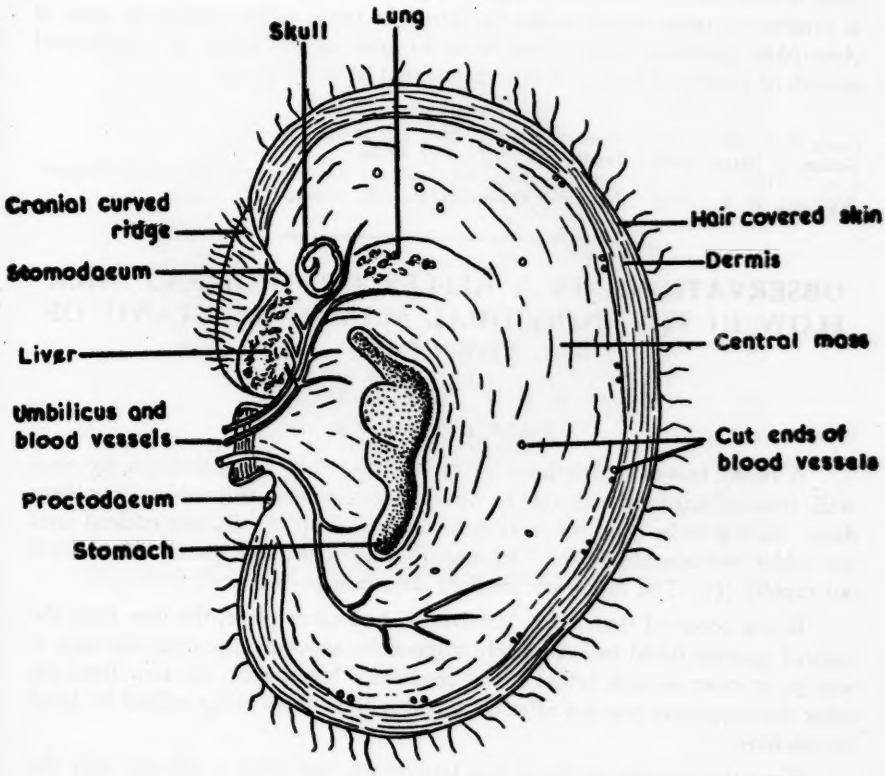

FIG. 2
Schematic drawing of sagittal section showing internal structures, medial view.

fertilisation of an imperfect ovum which has developed as a parasite on a normal twin. Evidence would suggest that these are cases of monovular twinning in which a state of abnormality arises at a very early stage. It may well be that this factor operates at the time when separation of totipotential cells would ordinarily produce two normal twins. Subsequently unequal growth occurs, probably placental in origin, but conditions allow of the fusion of

allantoic vessels and the union of the two individuals by means of a common placenta, thus the circulation of the acardiac is sustained by the heart of the normal twin.

In the case under review derivatives of all three germ layers were present and although nothing resembling normal architecture can be said to have occurred, it was possible to recognise the outer epithelium of the body and hair, proctodeal and stomodeal epithelium, dermis, bone (cartilage), blood vessels, and an entodermal pocket. It is thus possible to distinguish the case structurally from a teratoma in which less organised growth and no entodermal derivative is present—a point which might be borne in mind when classifying cases of *Amorphus globossus*—and which seem to arise as the result of unorganised growth of groups of cells at a different period of development.

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OBSERVATIONS ON A REFLEX CONTROLLING MILK FLOW IN THE INDIVIDUAL MAMMARY GLAND OF THE COW

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A FRONT teat of a Shorthorn heifer was injured by a cut through the sinus wall, from which milk was able to flow without passing through the papillary duct. As was to be expected, only an occasional drop of milk was noticed until the udder was stimulated for "let-down," after which the gland milked itself out rapidly (1). The injury occurred 82 days post-partum.

It was observed that, after "let-down" had taken place, the flow from the injured quarter could be completely stopped by touching the teat, and that it was 30 or more seconds before it was resumed. Meanwhile, the flow from the other three-quarters was not affected, whether these were being milked by hand or machine.

Since the response to touch was immediate, and since it affected only the one gland, no hormonal control can be postulated. Nor can there be any voluntary control since there is no striated muscle either at the base of the teat, in the gland sinus, or in the ducts leading to it. It is therefore concluded that a contraction of smooth muscle at the base of the teat, including the annular fold or folds, is responsible for the inhibition of flow by closing the passage between the gland and teat sinuses.

It is suggested that this contraction may occur frequently, especially when the teat has been injured either externally (cut, scratched or chapped) or internally (by unskilled or prolonged milking). Cows with sore teats are often hard

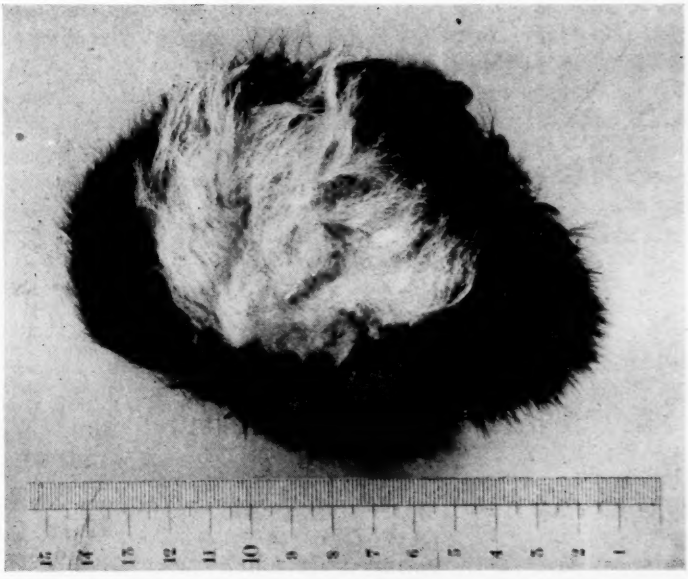

FIG. 1
Photograph of intact specimen showing centrally-placed umbilicus, half-lateral view—centimetre scale.

(*Article by Ottaway*)

to milk, not because of any unduly tight sphincter muscles, but because of the difficulty found in getting the milk into the teat sinus; it is sometimes impossible to milk such cows by machine.

Petersen has drawn attention to the " creeping " action of teat cups in closing the passage between gland and teat sinuses, thus preventing the emptying of the gland (2). It is now submitted that this " creeping " may be effect rather than cause, and that this reflex contraction may normally take place at the " end point " of milking (3), after which either machine or hand stripping is required if the gland is to be further emptied. Both stripping techniques usually consist of stretching the teat, which presumably prevents the contraction. It is even possible that this reflex is a protective mechanism, and that stripping enables more milk to be obtained at the risk of trauma which may be conducive to mastitis (4). There is now considerable evidence that susceptibility to mastitis is not increased when 1 lb. or so of milk is left in the vessel, nor is this necessarily followed by a reduction in yield; indeed, complete milking is known to be impossible without an injection of oxytocin (5), (6), (7).

The above observations would seem to confirm the conviction of milkers that cows can " hold " their milk in one or two quarters while letting it down from the others.

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HARD PAD DISEASE AND ITS TREATMENT UP TO DATE

By EDGAR VON LUSTIG-LENDVA, M.A., M.R.C.V.S.

THE conversation about what now seems to be called permanently " Hard Pad Disease " has now been going on in the Veterinary papers since early 1947. It was started by Mr. Townson, who described a catarrhal fever in dogs, one symptom of which was an occasional encephalitis. He was followed by a series of practitioners who, realising the gravity of the new syndrome, expressed their anxiety about the lack of a specific treatment and made suggestions as to symptomatic and more general therapeutics.

In April, 1947, Major Kirk related a suggestion by Dr. Winsser, of Leyden, to use Liver Concentrate as employed in Fox Encephalitis in Holland. Dr. Winsser repeated this advice to me in the course of a correspondence I had with him 12 months ago.

Messrs. McIntyre, Trevan and Montgomery, announced a serum in February, 1948.

These two drugs seem to-day to be the main weapons in our war against Hard Pad Disease.

To the practitioner, Hard Pad appears in many guises, and I believe that several more drugs can be employed usefully in addition to the above-named.

Hard Pad disease seems to be caused by a neurotropic virus, distinct from the Laidlaw-Duncan canine distemper virus, but probably related to it.

The initial stage of the disease is always a period of fever, varying between 103° to 104° Fahrenheit. During this "initial stage" the lay owner will attribute the varied behaviour of the animal to many causes, but rarely to a disease grave enough to warrant veterinary advice, until the animal shows signs of either pneumonia or enteritis, or both. Pneumonia and diarrhœa usually react to symptomatic treatment, but tend to return. The temperature never varies, even when the symptoms of pneumonia or enteritis disappear. This stage usually lasts from 3 to 4 weeks only. Only two dogs showed a shorter "initial" period. These two became victims of the disease after extensive wounds on their feet.

The second stage is marked by swelling of the pads. This condition which has given the disease its name, occurs in the majority of cases, but not always. The temperature remains high. Often the animals show purulent discharge from eyes and nose. The striking feature here, is that this discharge does not react to penicillin or sulpha ointments applied locally.

In several cases the patient shows marked pain in the joints and signs of rheumatism, with subsequent muscular atrophy.

The third stage is the encephalitic stage, with fits increasing in frequency till finally the animal succumbs to the disease in complete stupor. At post mortem the findings vary according to the stage in which the animal has been destroyed, showing either pneumonia or enteritis and/or the typical changes described by Messrs. McIntyre and others. If the dog has been destroyed or has died in the encephalitic stage, the microscopic picture shows degeneration of ganglia which are displaced either by Glia-cells or bodies created by the disease.

The only boon for the veterinary surgeon lies in the long course of Hard Pad disease, giving the practitioner the much needed time to fight the virus before it enters and alters the central nervous system.

The action of liver extract is as yet, not quite clear. I attribute the result of this treatment to two factors. Firstly, the Vitamin B content; secondly, an action comparable to the action of liver extract on the demyelination of the cord in pernicious anæmia in man. The dosage is 1 to 2 cc. (according to size of the dog) on three to four consecutive days. In fifty per cent of the cases so treated, the temperature drops within 48 hours without any ill or after-effects. It is advisable to add a local anæsthetic to the injection to prevent pain and fits. With the application of liver extract, one of three treatments can be combined:—

1. In those cases where pus is present penicillin, or if the microbe seems resistant to penicillin, vivicillin can be used and has proved very useful in my practice.

2. When the animal is suffering from arthritic or rheumatic pains, I use 5 to 6 cc. of Leucotropin, reinforced with 30 mg. of Vitamin B, per cc. The reaction to the injection is sometimes rather strong, with heavily increased micturition, but the patient appears greatly improved after the second or third injection. In one case an incipient pneumonia was cut short.

3. When the animal seems to be on the verge of a fit, i.e., when as one client aptly described it, the dog is "constantly followed by a ghost" two to three capsules of Nembutal Aspirin per day usually prove effective to alleviate hypersensitivity and excitability.

The Hard Pad Serum I used only in two cases where the owners were able to afford the price. The first injection depressed the temperature within twelve hours, but the disease returned and had to be treated non-specifically after the second injection.

Under the above treatments 90 per cent of the cases seen in my surgery recovered.

Summary

Hard pad is a virus disease which is distinct from canine-distemper. The non-specific treatment consists in Liver Extract plus either Penicillin, Vivicillin, Leucotropin or Nembutal Aspirin.

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NEW RULES FOR ESTIMATION OF DOSES TO ANIMALS

By ABD EL AZIZ SHARAF, M.V.Sc.

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THERE are different systems for dosage, the most accurate of which is to give the drug per kilogram or pound body weight. In the literature there is no fixed rule stated to be taken as a guide in the practice for estimating the doses for younger animals.

The present writer, therefore, suggests that the best method is to fix the amount of each drug to be given to the different adult animals, while the dose of the younger animal is then reckoned in proportion to that of the adult according either to their age or weight. As it is not convenient to weigh animals in all cases, and it seems very difficult to estimate the exact weight specially of the big animals, the writer suggests that one takes the animal's weight as a basis in estimating the doses in small animals as in canine practice, and age as a basis

in calculating the doses for the large animals. The following are the rules recently investigated by the writer:—

A—*Rules for Estimating Doses in Canine Practice.*

Rule 1.

For estimating the dose of a young dog of any breed, divide the weight of this dog by the average weight of the adult breed of this particular dog; the result is the fraction of the adult dose to be given for the younger dog, i.e.:

$$\frac{\textit{Weight of the young dog}}{\textit{Average weight of the adult breed of this dog}}$$

Rule 2.

For estimating the dose of any breed of dogs, take a dog about the weight of a fox-terrier as a standard (about 20 lb.), and then divide the weight of this particular dog by the weight of the standard fox-terrier, i.e., 20 lb., the result is the fraction or multiple of the adult dose to be given for this particular dog, i.e.:

$$\frac{\textit{Weight of any breed of dogs}}{\textit{Weight of the standard fox-terrier dog}}$$

B—*General rule for estimating doses to younger animals, according to age*

The Rule:

For estimating the doses for any young animal, divide the age of this young animal by the age at which this animal is considered adult, the result is the fraction of the adult dose which can be safely given to the young animal, i.e.:

$$\text{The dose of the young} = \frac{\textit{Age of the young animal}}{\textit{Age of the adult animal or breed}} \times \text{adult dose}$$

Application.

For estimating the dose of a 3 months old calf:

$$\frac{\text{Age of the calf}}{\text{Adult age of cattle (say 2 years)}} = \frac{3 \text{ months}}{2 \text{ years}} = \frac{3}{24} = \frac{1}{8} \text{ of the adult dose of cattle}$$

Conclusions

In applying these rules in the practice, the following conclusions should be considered:—

(1) The age at which the animal is said to be adult differs in the different countries, as there is excessive variation in climate, feeding and other influences which may retard or hasten the onset of the adult age in animals.

The dose for the younger animals must be, therefore, changed accordingly on applying the above rule of age in the different countries.

(2) If it is possible to accurately weigh big animals, the rules of weight applied in dogs may be also applied in equines and in cattle. The average weight of each adult breed should, therefore, be known so as the rule can be safely applied separately for each breed in every country, e.g., the average weight of brownswiss cattle is about 1,500 pounds, that of an Arab horse is about 1,000 pounds, and that of a fox-terrier dog is about 20 pounds, etc.

The Soft Palate of the Camel.

(Article by Abd El Hamid Hegazi)

(3) In applying these rules for estimating the dose of a toxic drug, care should be taken as to the individual variations in animals, to their idiosyncrasy to drugs, and to the rate of toxicity of such drugs.

(4) Sex of animals should be considered, as males are in most cases heavier than females, e.g., a Jersey cow weighs about 900 pounds and a Jersey bull weighs about 1,500 pounds; an Egyptian buffalo weighs about 1,200 pounds, but the bull weighs about 1,500 pounds, etc.

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THE SOFT PALATE OF THE CAMEL

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Introduction

THE soft palate of the camel, especially its bladder-like part, has been the subject of several discussions. The Egyptian camel is usually in the state of must during the months of January, February and March and the bladder is then seen protruding from the side of the mouth, associated with salivation and a gurgling voice. The following is a report of work that has been carried out to ascertain the structure and function of this organ, or Qulla as it is called by the Arabs.

Literature

Chauveau (1891) states that the soft palate of the camel is well developed and the channel between the mouth and the pharynx is long and narrow. The anterior pillars ascend on to the anterior surface of the soft palate which is a pyramidal, soft, relaxed appendage with a granular surface, freely movable to either side. This appendage has two prolongations curving laterally and below each of these is a small sinus or diverticulum. The mucous membrane is of a dark colour resembling that of the cheeks and hard palate.

Lesbre (1903) remarks that the soft palate is very large, especially in the case of the male camel. He continues that according to Vallons, the soft palate measures thirty-three to thirty-five centimetres, but Lesbre himself gives its length as not more than twenty-five centimetres. Describing the isthmus

faucium as large and dilatable, he adds that there is a pair of strong anterior pillars, between which one can push one's fist. Lesbre concludes by saying that the soft palate ends at a large opening encircling the epiglottis and by two lateral folds surrounding the larynx. These folds, the posterior pillars, join at a short distance beneath the entrance to the œsophagus.

Leese (1929) mentions that the soft palate begins at a distance of one and three-quarters feet from the incisors and that in the camel a loose expansion over one foot in length hangs from its lower surface: this is smaller in the female.

The soft palate of the horse is described by Sisson (1938) as being about six inches long. Its length and contact with the epiglottis may restrict mouth breathing in these animals and cause vomiting to occur through the nose. He also mentions that the soft palate slopes downwards and backwards from its junction with the hard palate and that its pharyngeal surface presents the openings of palatine glands. Sisson then refers to the presence of anterior and posterior pillars, the latter extending to the origin of the œsophagus. The tonsil of the horse is not compact, but consists of a series of lymphoid tissue masses and mucous glands in the space between the pillars. The palatinus muscle is small, consisting of two small muscular bundles lying together at the mid-line. The description of the soft palate of the horse by Chauveau (1891), McFadyean (1922), Strangeways (1919) and Bradley (1923) is similar to that of Sisson except that Bradley refers to the anterior and posterior pillars as the glosso-palatine and pharyngo-palatine arches respectively.

The soft palate of ruminants is shorter than that of Solipeds, according to Chauveau (1891). This is supported by Sisson (1938) in describing that of the ox, which he states is long enough to close the isthmus faucium, but that the posterior pillars do not extend to the origin of the œsophagus. He also refers to the better development of the palatinus muscle and to the presence of a compact bean-shaped tonsil, which projects laterally and not into the isthmus faucium.

The same author mentions the great length and thickness of the soft palate of the pig, which is nearly horizontal and extends to the middle of the oral cavity. The uvula, a small median prolongation, is also described. Again according to Sisson, the soft palate of the dog is thick, except at the margins; also present are a compact tonsil and a double posterior pillar on either side.

Materials and Method

The soft palates of twenty camels slaughtered in Belbeis and Cairo abattoirs were subjected to detailed measurement and dissection. Other camels were dissected in the Anatomy Department of the Faculty after injecting them in the usual manner with a solution formed by four litres of formalin, two litres of glycerine, two litres pure carbolic acid and four boxes of blue. The mixture is heated on a water bath and continually stirred.

Microscopical Examination

The soft palate of the camel is remarkably long, due to its peculiar disposition and arrangement. The fixed part lies on the horizontal palatine bone and

is loosely attached to the underlying sub-mucous tissue. At the free posterior border of the bone, the soft palate is reflected forward for a distance of about thirty centimetres when stretched, forming what may be described as the palatine surface of the soft palate from its opposition to the hard palate. The root of the tongue is connected to the soft palate by the anterior pillars. The palatine surface is then folded on to itself and proceeds posteriorly to reach the palatinus muscle, being closely attached to the ventral surface of this muscle along its length. This reflected part can be termed the lingual surface from its proximity to the tongue. A space in the mid-line between the palatine and lingual surface constitutes the entrance to the cavity between these layers.

The palatinus muscle is well-developed, extending from the aponeurosis of the soft palate to the aditus laryngis. Here it bifurcates, each branch proceeding caudally to meet its fellow above the origin of the œsophagus, to form the posterior pillars. In the region of the anterior pillars the mucous membrane of the soft palate is very loosely folded, so that in the natural state a lateral fossa can be seen on either side between the anterior pillars and the reflected part of the soft palate. Between the layers of the mucous membrane of the diverticulum of the soft palate are scattered small pink-coloured glands comparable to the tonsil of the horse, but unlike that of other animals they are minute and widely separated. These glands open on both surfaces of the diverticulum by very small short ducts.

Microscopical Examination

Examination of a section reveals the soft palate of the camel to differ in structure from that of other domestic animals. On both surfaces of the wall of the diverticulum stratified epithelium is present and between these is a thick layer of areolar tissue. Small areas of mucous glands are seen in the areolar tissue in some sections, showing the presence of palatine glands.

In a section of the soft palate of a typical domestic animal the two layers of stratified epithelium enclose a thick and continuous layer of mucous glands together with a layer of muscular tissue. There is no areolar tissue.

Conclusion

It is the free posterior border of the diverticulum that encircles the epiglottis, not the opening into the diverticulum, as stated by Lesbre.

From the description of the bladder, it is obvious that the appendage contains a cavity between the two layers capable of attaining a larger size when distended with air. Leese does not agree as to the existence of such a cavity.

There is a great diversity of opinions regarding the main function of this structure. It is usually stated that the organ is evident when the camel is in must (period of sexual desire). The diverticulum is also thought by some to act as a means of retarding thirst.

Cuvier and Lesbre report that the bladder of the soft palate is not seen in either the two-humped camel or the llama. The majority of research workers agree as to the non-functioning of the diverticulum of the female.

Observations collected on the function of this structure during the course of the study do not differ from those of other workers. It can only be concluded that the diverticulum is a means of expression of excitement at times of sexual desire or of rage during the period of must.

Acknowledgement

The writer gratefully acknowledges the help given by Dr. N. Goergi, Head of the Department of Anatomy, in preparing and writing this article.

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ABSTRACT

A NEW APPROACH TO THE TREATMENT OF BLOAT IN RUMINANTS*

By A. H. QUIN, D.V.M., JAMES A. AUSTIN, B.A., M.S.C., and KARL HATCLIFF, B.S.

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PRIMARY or secondary bloating of ruminants is an economic problem of major importance in all countries.

Some very fine research reports have appeared in the literature of animal husbandry and veterinary science. Among these should be mentioned the reports of Cole *et al*[1] in America, Melville *et al*[2] in New Zealand, Clark and Quin[3] in South Africa, and Evans and Evans[4] of Britain.

Noteworthy contributions on the physiology of ruminant digestion have been made by Dukes of Cornell, Schalk of Ohio, Hewitt and Bergman of Ames, and many others. Hastings[5] has pointed out that the rumen is a virtual metabolic beehive of essential activity, and that countless species of bacteria and protozoa enter into the splitting of cellulose, the defractionation of proteins and the synthesis of vitamins.

The Treatment of Bloat

Treatment procedure for bloat on a symptomatic basis may be classed as (1) palliative, and (2) emergency. Palliatives include the ages-old gag in the mouth, cold water on the flanks and peroral administration of antiferments.

* J.A.V.M.A., CXIV, 1948, 313-14.

Emergency treatments include all of the foregoing palliative measures plus tapping, evacuation of the rumen by the Kingman tube and rumenotomy. All of these corrective treatments possess limitations too well known by all veterinarians to merit more than passing mention. For example, Clark[6] in a recent report warned against the danger of ruining the essential bacterial flora by administration of "disinfectant type" antiferments such as formalin, copper sulphate, turpentine and cresylic acid compounds.

The Causation of Bloat

Research has still failed to clarify all the answers to the problem of why some animals bloat and some do not. Clark and Quin[7] and, more recently, Evans and Evans,[8] have cited the relation of contained hydrocyanic acid in legumes as a causative factor in ruminant meteorism. Others have cited that the saponin content of legumes and grasses is of etiological significance. But, whatever the true cause, the bloated animal is incapable of normal belching and regurgitation.

Autopsies and rumenotomies on cattle suffering from that type of tympanitis commonly known as "frothy bloat," have invariably shown that a froth composed of bubbles is homogeneously mixed throughout the ruminal and reticular food mass. Within the bubbles are such toxic gases as methane, hydrogen sulphide, nitrogen and carbon dioxide. The authors postulate that bloating is primarily due to gas entrapment within the froth bubbles because of decreased surface tension. Clark[9] has recently shown by *in vitro* tests that turpentine—probably the best of the drugs used in bloat—exerts its action by *increasing* surface tension. This same type of action is typical of kerosene and mineral oil.

To those unacquainted with the physics of surface tensions, a simple example will clarify understanding: add one of the modern washing compounds to water and a "mountain" of froth or suds occurs because surface tension has been decreased to the point where particles of air are trapped in a film of detergent. This same phenomenon occurs within the paunch of a bloated ruminant.

A New Approach to Treatment

Samples of a surface tension-increasing agent†—a preparation containing a highly polymerised methyl silicone—were submitted to 34 veterinarians in different parts of the country for field trial on actual cases of bovine bloating. The product was injected either directly into the dorsal vault of the rumen through a 14 gauge or larger hypodermic needle, or diluted with water and given perorally as a drench or by stomach tube.

Of the 155 cases of bovine bloat treated in this manner, 115 made perfect recoveries, many of them in a phenomenally short time. Most of the cases recovered after a single treatment. Some were given purges, stimulants, etc., or were tapped prior to treatment. The recovery rate was approximately 80 per cent when the agent was used in tablet form, crushed and diluted

† A preparation, "Tympanol," prepared and developed by Jensen-Salsbery Laboratories.

with water, and 95 per cent when a ready-to-use suspension was injected. The results indicate that the treatment is most effective by intraruminal injection.

The dose of the prepared suspension is 100 c.c. for adult cattle and 25 c.c. for sheep and goats.

While only one actual case report is available, it appears that this method of treatment is equally applicable to cecal tympany of horses and mules.

Summary

Primary bloating of ruminants is related to entrapment of gas bubbles within the food mass of the rumen and reticulum because of decreased surface tension. A total of 155 cases of bloat in cattle were treated with a highly polymerised methyl silicone to increase surface tension of the ruminal food mass. This medication was given by intraruminal injection, by drench or by stomach tube. Of the 155 treated cases, 115 made perfect recoveries. Results indicate that the treatment is most effective by intraruminal injection.

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REVIEW

PRINCIPLES OF VETERINARY SCIENCE by Frederick Brown Hadley, D.V.M., 4th Ed., pp. xii + 522, 100 photographs and diagrams. Price 25/-. London. W. B. Saunders Company.

To teachers and students of the agricultural sciences this book has proved to be of great use for many years, and in its fourth edition undoubtedly will continue to provide a much-needed pattern for the teaching and study of veterinary subjects. It deals with veterinary science in a comprehensive and concise manner. At the beginning, the animal and medical sciences are outlined briefly, and this is followed in the present edition by a new chapter, entitled "The Animal World," in which are described the various classes and species to which domestic animals are related.

The general arrangement of the subject matter remains substantially the same, and the book is divided into two main parts, of which the first deals

with anatomy and physiology, and the second with diseases. In Part I, the treatment of the structure and function of the healthy body as one subject has been maintained, and the various systems of the body form separate chapter headings—an arrangement which not only provides for the student a good plan of study, but which also allows quick and easy reference. The chapters on the digestive and urogenital systems are particularly well constructed and contain a great deal of essential information in a concise and well-illustrated form. A table of digestive secretions has been added, and the section on breeding has been enlarged. All the sub-headings are bold enough to be found quickly, and each chapter of Part I ends with a description of the commercial products derived from that particular system of organs.

The second part of the book deals with diseases, and here the author has overcome a number of major difficulties of presentation and order. In a textbook of this kind, one of the chief problems is to decide upon the extent and scope of information to be given on the more basic facts of general pathology and surgery on the one side, and on the other, upon the provision of important and recent information relating to the study of disease. Whilst it is appreciated that a book of this kind should not attempt any undue enlargement, it is desirable that students should be made aware of the main advances in the field of preventive medicine. In the section dealing with communicable diseases, this edition provides little information in advance of the previous one. The results of vaccination against brucellosis and swine fever are dismissed in a few words, whilst the very considerable advances into the treatment of bovine mastitis with penicillin are not mentioned, and where the author deals with the causation of this disease, he has confused *Str. zooepidemicus* with *Str. dysgalactiæ*. Some of the information relating to mineral deficiency is now out of date and might well have been enlarged at the expense of part of the chapter dealing with veterinary medicines.

The book provides most of the essentials of an overall picture of the principles of veterinary science. British students will require additional information on methods of disease control, such as The Diseases of Animals Act, which are peculiar to this country, but in general they will find this book to be of great assistance in acquiring an understanding of the subject, for it contains a large and varied amount of information within a small and easily-referable compass.

J.C.B.

Publishers' Notices

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THE USES AND LIMITATIONS OF THE CAPRINIZED VIRUS IN THE CONTROL OF RINDERPEST (Cattle Plague) AMONG BRITISH AND NEAR-EASTERN CATTLE

By J. T. EDWARDS

July issue 1949

A POSTSCRIPT

SINCE this article was published, I have learned from him that the later Indian experiences have actually been collated by my former Muktesar colleague, Mr. J. R. Haddow, and the monograph has been delayed appearance pending publication of the earliest phase, which was not clear to him. A somewhat fuller account is given of that phase in the essay mentioned in the list of references, under the name of my former Egyptian pupil, Dr. Osman A. Zaki. At a much earlier stage, in 1932 and 1933, I had written up a brief record in preparing for publication in the Journal the field results which had been forwarded to me after my return from India to England by the late Major R. F. Stirling and his assistants who were associated temporarily, in 1927, with me at Muktesar and which had been collected by them after their return to field duty in the Central Provinces. It had been Stirling's wish, in forwarding the rough data to me, that I should publish them under my own name, as the originator, as he said, of the newer method, but as he himself was entirely responsible for their factual accuracy the responsibility as well as the privilege of authorship, I felt at once, must be assigned to him. At that time, a script was also submitted by me to the Editor of this Journal, the late Sir Frederick Hobday, explaining the significance of the announcement, which he willingly consented to publish as it stood as an editorial article. Actually, from the standpoint of strict priority, on closer examination of the records, Kerr, in Bengal, can claim precedence in the field discovery that the goat virus can be used safely alone in practice in the immunisation of Indian plains cattle. His finding dates back to January, 1931, whereas James, Stirling's assistant, made his discovery three months later, in April, 1931. I have, however, been unable yet to verify the impression I have entertained that both were anteceded by Simpson and his assistants (who had also undergone training at Muktesar) in Mysore; because, at any rate, their work with goat virus followed immediately upon their large-scale field campaign with the old serum-simultaneous method, in which, as had always been done, fresh bovine virulent blood was used. And, so, with the change-over to goat virulent blood, the finding that goat virus could be used alone, which possibility had been forecast farther back in 1928 from the Muktesar experiments was inevitable. I think it is not far wrong, and hope it is not unfair, to say that the practical field discoveries were made in the above three different areas in India simultaneously and independently. On my own part, at any rate, at this date, I have no wish other than to give all those early field workers in India, and also in Burma, every possible credit for their splendid work and their keen co-operation.